

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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New Power Drawing Presses for Tinware.

The manufacture of tinware in its various forms has become a great industry in this country, and has led to the invention of special presses of various kinds for producing it rapidly and economically. We illustrate this week two of the presses lately introduced by the Ferracute Machine Co., of Bridgeton, N. J. Fig. 1 shows a combined power drawing and embossing press, which is especially adapted for any kind of deep drawn work with lettering or embossing—such as solid rim sardine boxes, baking-powder cans, salve, pill and blacking boxes, &c., up to 1 1/4 inches deep, if small, and 7 inches diameter or more, if shallower. The upper die is fastened to a slide-bar as usual, and the lower one is set on a raised bolster. The punch (attached to inner slide-bar) has on it the raised lettering, beads or other designs, and the "matrix" with sunk lettering, &c., is set on the bed of the press. The inner bar is arranged with extra long stroke, so that after the work is cut and drawn it is passed down through the lower die on to the matrix, where it is embossed, and as the plunger goes up, the work, as the press is inclined, slides out from under the arched bolster and down through the hole in the back part of the press, thus being made all complete at one stroke. The dimensions, &c., are as follows: Hole through bed, 8 1/2 inches; height to outer slide-bar when up, 7 1/2 inches, and to inner slide-bar, 9 1/2 inches; stroke of outer slide-bar, 3/4 inches, and of inner slide-bar 3 1/2 inches; adjustment of each bar, 3/4 inch; speed of main shaft, 30 revolutions per minute, and of back shaft, 180. The total weight is about 2000 pounds. All the parts are built extra heavy, and various convenient adjustments are provided for setting the dies quickly and accurately. For light work, such as blacking-box covers, &c., the same press (with extra fly-wheel substituted for gearing) can be run very fast, and an automatic "push-out" and gauge can be attached, so that from 30,000 to 50,000 pieces can be made in 10 hours.

Fig. 2 shows a straight-sided power drawing press, arranged with extra long stroke, and is intended for small, deep work, such as drinking cups, ladles, dipper bowls, small saucepans, and other work not more than about 10 inches diameter and 2 inches deep. It is adapted for conical (or V) blank holders, but plain flat drawing dies can be used in it also. It is not arranged for cutting. Having straight sides and the shaft passing directly through the frame casting, it is very stiff and strong. The total height is 8 1/2 feet. The height from bed to outer slide-bar, when up, is 17 inches, and to inner slide-bar, when up, 20 1/2 inches; the stroke of the outer slide-bar is 6 inches, and of the inner slide-bar, 8 1/2 inches. If desired, it can be built with shorter strokes—outer bar, 2 1/2 inches and inner, 5 inches—for any work requiring only flat blank holders. The adjustment of each slide-bar is 3/4 inches. The hole through the bed is 10 inches square, and the largest blank that may be used, 14 inches. The diameter of the fly-wheel and loose pulley on the back-shaft is 33 inches, while the width of each wheel is 5 inches. The speed of the cam-shaft is about 25 revolutions per minute, and that of the back-shaft, 187. It is provided with two sizes of bolsters, which may be used singly or one upon the other, thus giving 2 inches more adjustment than above mentioned if desired.

The weight of the fly-wheel is 500 pounds, and the total weight about 4300 pounds. It is also built as a double action press, being fitted up with the same frame, legs, &c., but having eccentrics substituted for the two cams, a fly-wheel for the back gearing, besides some other changes. It is thus adapted for a variety of sheet iron, tin and brass work. It is also built as a deepening press, being fitted up with the same frame, legs, &c., but the outer slide-bar, cams and pitmans are omitted, thus making it a single action press with very long stroke, adapted for the further deepening of articles already formed. It can also be used to good advantage for "curling" or wiring large pail bodies or other work requiring considerable height under the slide-bar.

The manufacturers aim at securing durability and accuracy by careful workmanship, scraped surfaces, standard reamed holes, case-hardened bolts and nuts, steel shafts, clutches, pitmans, pitman nuts, die clamps, wrenches, &c. A new automatic steel clutch has lately been adopted, which is very simple and durable, and various other improvements have been added.

Large Production of Steel Ingots and Rails.

The Scranton Republican of recent date has the following: The Scranton Steel Works made in 24 hours, Wednesday, December 10, 466 tons 12 cwt. of ingots. The steel works also made last week their largest week's work to date, 2415 tons 7 cwt. of ingots, beating their largest previous work by 62 tons. The steel-rail mill rolled last Wednesday 736 bars in 10 hours and 50 minutes; average time per bar, 53 seconds; and Wednesday night, 800 bars in 11 hours and 10 minutes; average time per bar, 50 1/2 seconds, making a total of 1536 bars in 22 hours, which, it is claimed, has never yet been beaten on any rail train in the world. The largest previous recorded output was 1044 bars in 24 hours, made at Harrisburg in 1877. The rail mill also rolled last week 1877 tons 15 cwt. of rails, this being the

largest week's work ever yet recorded on any one rail train either in Europe or America. The largest previous work was at Harrisburg, being 1617 tons in November, 1877. We will also call the attention of our Lehigh friends to the fact that the No. 1 Furnace of the Lackawanna Iron and Coal Company has, during the last 14 weeks, made the extraordinary average of 544 tons weekly, and their Franklin Furnace, during the same time, 478 1/2 tons weekly.

Iron Making in Japan.

Prof. B. S. Lyman, the energetic geologist in charge of the Geological Survey of Japan, gives, in a recent report of progress, an interesting and lengthy account of the primitive methods used in Japan to produce both pig iron and steel from iron sand, which is obtained either by cutting down the granite and breaking it up by hand and washing it, or the river sand is washed, or the ore is taken from alluvial ground. The ore from

cent invention of western countries; the size, however, is small. The height is only 3.7 feet, and the width at top 3.2 feet outside, or 2.4 feet inside, but the length is 9 1/4 feet outside. The outer sides are battering, and the inner ones still more so near the bottom, so that only half a foot along the middle of the bottom is flat. The vertical section crosswise differs, then, from that of the blast furnace in being widest at the top instead of near the middle. In the course of the operation, however, the inner sides rapidly break away toward the bottom, so that the section becomes much wider there than at first. The extreme lowness of the furnace can be accounted for by the fact that the minuteness of the particles of the ore enables them to be decarburized in a very short descent. The great length of the furnace is made up for by a row of 19 tuyeres on each side, for which there are elliptical holes 0.2 foot high, and 0.7 foot above the bottom outside and 0.5 foot inside; so that the heat is kept up through-

charcoal, in burning, has become about 0.4 of a foot shallower than at first. Then they put on iron sand, perhaps about 16 kamme (133 1/2 pounds or one picul), but not a weighed quantity; then some more charcoal, until the top is made level again with the top of the furnace. When the fire has again become about 0.4 foot lower, another picul of iron sand and some more charcoal are put on, and so on repeatedly. The first day and night, ore and charcoal are charged about 33 times in 12 hours; and the second day at about the same rate, but growing quicker, so that on the third day there are 42 charges in 12 hours. Throughout the operation, slag is running out at the end holes of the furnace, and some pig iron, too, called dzuku, which, though variable, amounts to perhaps 180 kamme (1500 pounds) in all. On the fourth morning, at three o'clock (that is, at the end of 72 hours), after having charged in all about 3800 kamme of charcoal and 3600 kamme (30,000 pounds) of ore, they stop the blast (which

interruptions from disordered apparatus. In a year there are about 70 operations, with a vacation of two months in the hottest part of summer. The dzuku and kera both go to forges in other villages (Komuri, two leagues distant; Komaki, two leagues; Yakawa, three leagues; Maki, three leagues; Sumoni, two leagues), and are converted into bar iron there, yielding about 62 1/2 per cent. The dzuku is sometimes made in other villages into good cast iron by means of twice smelting.

The blast is given by a pair of wooden bellows on each side of the furnace; and they are like the bellows of an oil-well, except that they are in two halves, end to end, with the hinges of the top boards at the outer ends, so that the man who treads them stands in the middle, and steps first on one board and then on the other. The boards are each 5 feet long by 3 feet wide, and rise and fall at the inner end about 1 1/2 feet. The work is so severe that the men are relieved about once an hour, and in the 24 hours there are three sets of men, or six men in all. The nozzle is chiefly of bamboo, about .15 foot in diameter, but, at the furnace end, is of iron for a length of about two-thirds of a foot, and, at the very end, with an inside diameter of .06 foot. The furnace and bellows, charcoal and ore bins, and resting rooms for the workmen, are all in a high building about 50 feet square.

SCIENTIFIC AND TECHNICAL.

The list of devices proposed to utilize electricity for lighting has become so long a one that only the more prominent systems, containing striking elements of novelty or showing exceptional value, deserve a mention. Among these we would place

BROUGHAM & ANDRE'S ELECTRIC LAMP,

which has been exhibited in England. Its striking feature is that it to some extent combines illumination by the voltaic arc and by incandescence. It consists of two concentric tubes, separated by a non-conductor, and connected with the positive and negative terminals respectively. The inner tube contains a carbon rod, which rests with its lower point upon a metallic wedge which is in electrical contact with the outer tube. The lower portion of these tubes is inclosed in an air-tight vessel, so that the oxygen of the air inclosed is rapidly consumed during the beginning of the working of the light, and the carbon, therefore, burns away very slowly. The carbon consumption is thus lowered from 6 inches to 0.125 inch per hour, the light being partially due to incandescence and partially to the formation of an arc. The whole lamp is suspended in a vessel full of water, in order to cut off the access of air completely.

Herr Dr. A. Schertel, of Freiberg, has made some experiments to ascertain

THE MELTING POINTS OF SOME MINERALS

by using the Princep gold-platinum alloys, the results of which are embodied in the following table:

| | Gold. | Platina. | Deg. C. |
|---------------------------------|-------------------|----------|---------|
| Almandite..... | between 60 and 85 | 10 | 1,130 |
| (Granet)..... | and 85 | 15 | 1,160 |
| Hornblende from Marienberg..... | 92 | 16 | 1,130 |
| Amphibole from Lockow..... | 84 | 16 | 1,166 |
| Amphibole from Zillerthal..... | 50 | 50 | 1,185 |
| the Zillerthal..... | and 46 | 54 | 1,413 |
| Amphibole from St. Gothard..... | between 48 and 45 | 52 | 1,400 |
| Enstatite from Kufserberg..... | between 45 and 43 | 55 | 1,420 |
| Nickel..... | between 49 and 45 | 57 | 1,436 |
| | | 51 | 1,398 |
| | | 55 | 1,440 |

Dr. C. W. Siemens, the well-known electrician and metallurgist, has experimented for some time with

AN ELECTRIC FURNACE,

for the purpose of melting in considerable quantities highly refractory metals, such as platinum, iridium and steel. He was led to undertake these trials by the consideration that a good steam engine converts 15 per cent. of the energy residing in coal into mechanical effect, and that a good dynamo-electric machine is capable of converting 80 per cent. of the mechanical energy into electric energy. If this latter could be expended, without loss, within an electric furnace, then 12 per cent. of the total energy residing in coal would be available for melting the refractory material at any temperature required, and such a result would doubtless far exceed in economy that of the best furnaces that have as yet been constructed. In the small furnace which was exhibited before the Royal Society, the positive electrode, which was made of iron, entered from below the crucible containing the metal to be melted, whereas the negative electrode, which was a rod of carbon, was attached by means of a lever to a solenoid regulator. The crucible was surrounded by charcoal contained in a copper vessel to prevent loss of heat, and so intense was the heat accumulated that in about 20 minutes two pounds of broken files were completely melted. The arrangement was such that it may easily be applied on a large scale, and it is worthy of note that electric fusion has the great advantage of entirely excluding the atmosphere, and consequently the products of combustion from the substance in the crucible.

At Dundee some tests were made quite recently, on

THE USE OF THE TELEPHONE IN DIVING.

A helmet fitted into a telephone was used, and the practicability of the instrument was fully shown by the easy communication between those on shore and the diver.

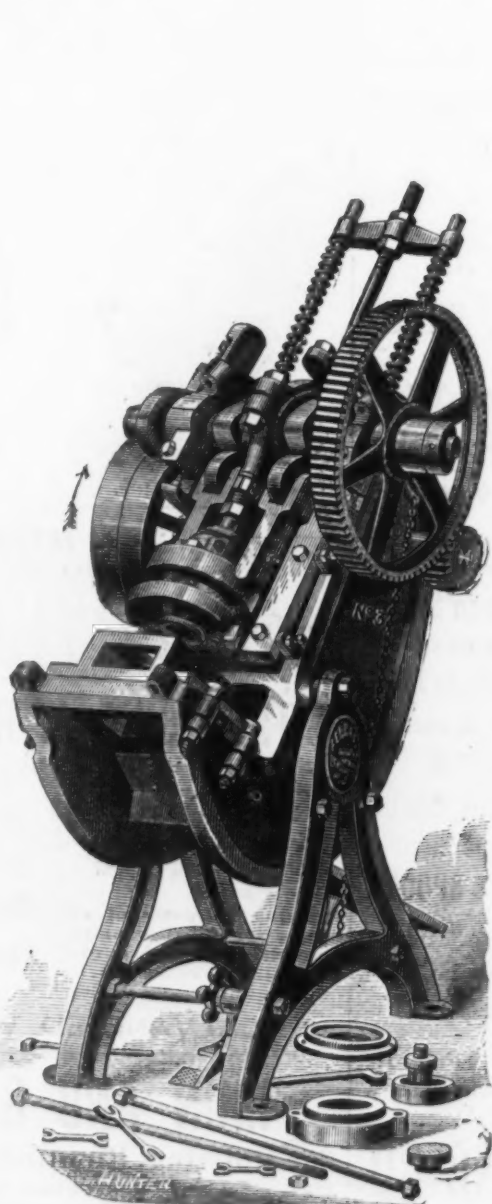


Fig. 1.—Embossing Power Drawing Press.

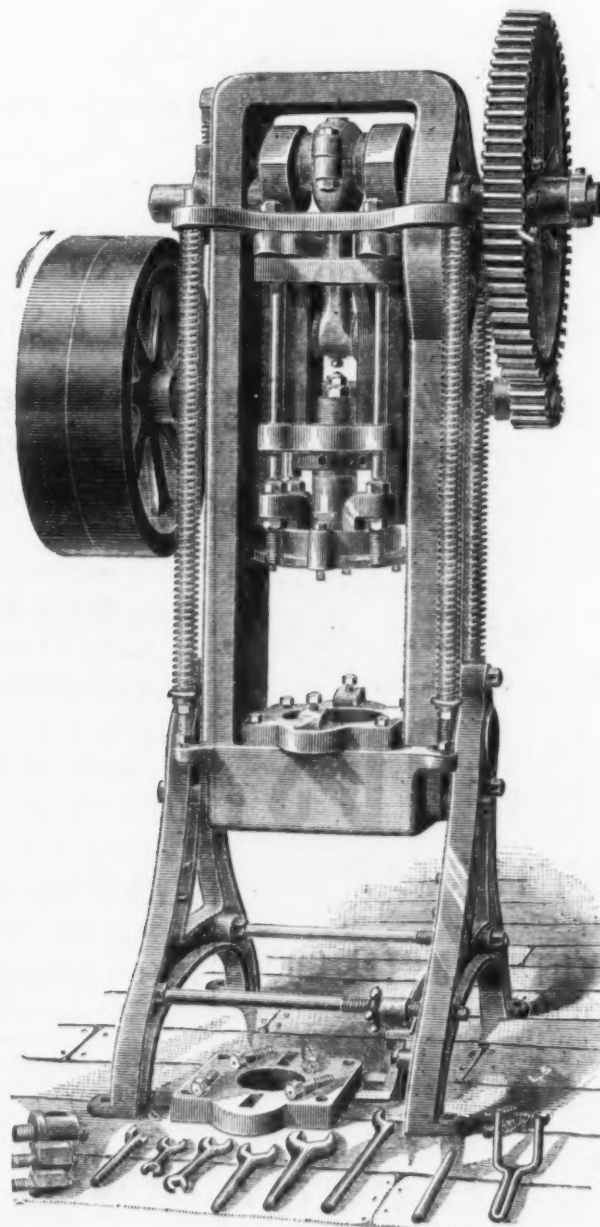


Fig. 2.—Long Stroke Power Drawing Press.

POWER DRAWING PRESSES FOR TINWARE.

such alluvium is reddish and more fusible than the other kinds, owing, no doubt, to its long exposure to weathering influences. The ore washed from the rock is next in fusibility, and the ore separated from river sand is the least fusible, probably owing to its being protected by water from the air, or because its weathered surface has been continually worn off. The difficult fusibility is very likely due in part to the presence of titanium. Most of the ore used at Amegawa is brought on horseback from various places over two leagues distant; but is washed again at the furnace and reduced to half its weight. Some ore, however, is washed on the hillside, close by the Amegawa furnace, in the winter half of the year; but the rock there is reckoned in general of inferior quality, though some parts are pretty good. Mr. Lyman estimated that the amount of ore washed out of the rock is about one-half of one per cent. of its entire weight.

The Amegawa Iron Works are over 100 years old. The only furnace there, like the others of Idzumo, makes both pig iron and steel in one operation of three days; but across the mountains in Bingo, with similar furnaces they make (it is said) only pig iron in an operation four days long. The furnace is essentially like the blast furnace of western countries; but extremely low and with a very long horizontal section, and of very little durability, as it is built merely of a common yellow clay. The shape is closely like that of the Rachette furnace, a re-

out the whole length. The progress of the smelting can also be viewed through the holes at the side of the nozzles, and any obstructing slag can be poked away with a small rod inserted there; and at each end of the furnace at the bottom there is a hole 0.4 foot in diameter for drawing off slag and pig iron, and there likewise the smelting can be watched. At the end of the first 24 hours that hole is closed and two other similar ones are opened on either side of it near the corners, as the side-walls have already become thin. Below the bottom, which is on a level with the ground, there is a layer 0.8 foot thick of ashes of the maki, a conifer; and below them there are 4.2 feet in depth by 3 1/2 feet in width and 9 1/2 feet in length of hot coals; and the five feet together are called the fukutoko (or hearth). Below it is a depth of 7 feet filled with red and black clay, from the bottom of which there is a horizontal drain to a neighboring hill-side. The whole depth of 12 feet is walled about with half a foot or more in thickness of stone (granite and other kinds). The fukutoko with the parts below is permanent, and at some places is not allowed to cool down for a hundred years. The furnace proper is built of wet clay in a day, and dried with a wood fire in the following night.

At three o'clock the next morning, the same brands from the wood fire are removed and the furnace filled with large charcoal; the tuyeres are adjusted, the coals kindled, and the blast begun. At about 5 o'clock, the

has been continuous) and take away the nozzles. Then they break up the furnace, brush off the coals that remain on the mass of metal that has been produced, and let it cool. The mass is steel, but the outside of it is bad steel, called kera; below it there is melted pig iron, or dzuku, which, on the removal of the steel mass, cools and becomes solid at once. The steel mass weighs about 540 kamme (4500 pounds), of which two-thirds is good steel, and the rest kera. The two are separated with the hammer. The dzuku weighs about 360 kamme (3000 pounds), or, together with the previous 180 kamme (1500 pounds), about 540 kamme (4500 pounds) in all, making the whole product then about 1080 kamme (9000 pounds, or about four tons), or 30 per cent. of the ore. With a large furnace sometimes 1200 kamme are produced. When the metal has been cooling a couple of hours, at about six o'clock in the morning, the steel mass is pulled out and then immediately the dzuku. The dzuku, without further cooling, is thrown at once into a small pond of water close by, and is afterward broken up with hammers. The hot steel mass is likewise thrown into water at some places, but not here; and after cooling, it is broken up into small bits. The same day that the metal masses are removed the furnace is rebuilt, so that on the fifth day the blowing recommences. In a month, then, there are seven or eight operations, except when occasionally there are

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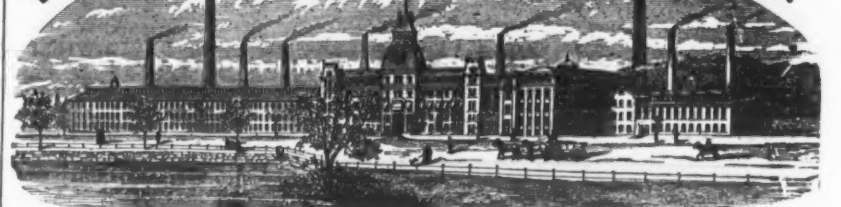
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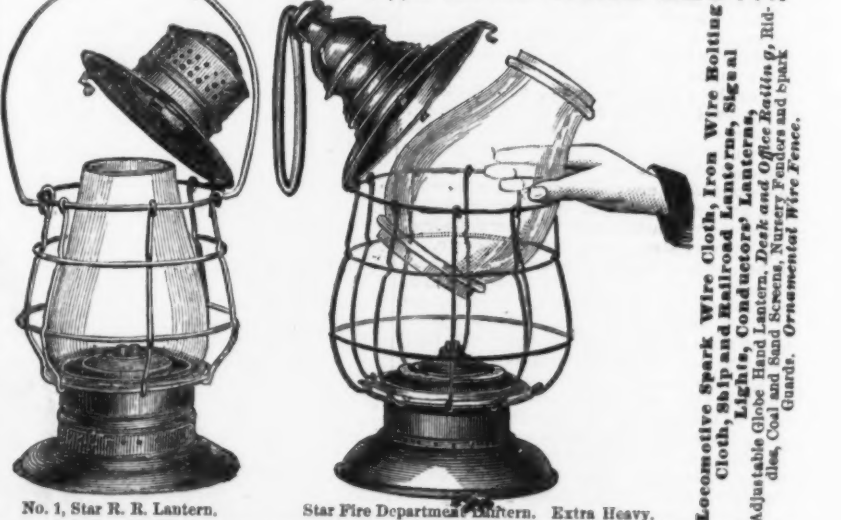


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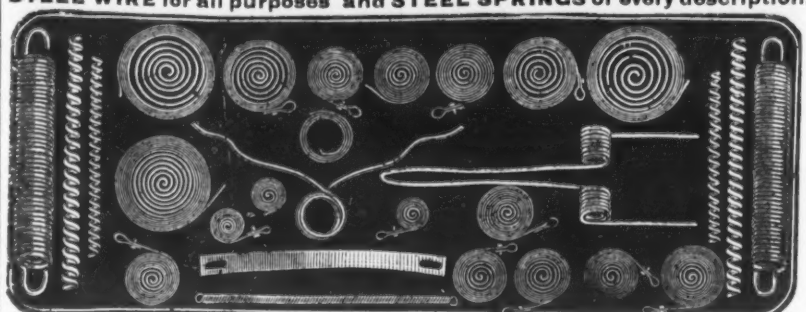
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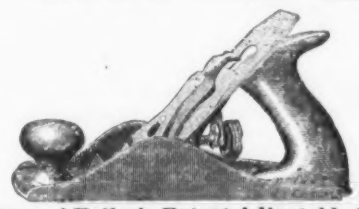
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Disastrous End of a Grand Scheme of Improvement in South America.

The once magnificent scheme for penetrating the extreme western borders of the Brazilian Empire and the mountainous territory of Bolivia lying beyond, by means of navigable communication through the Amazon River and its tributaries, has at last experienced an entire collapse.

It was confidently predicted that in the manner indicated, after surmounting the intermediate falls on the Madeira River, it would be practicable to forward to the seaboard, and thence to the markets of the world, the rich mineral treasures and choicest products of tropical growth. But the British House of Lords, puts an end to this scheme. It confirms the decision, on an appeal from the High Court of Chancery, ordering a distribution to the stockholders of some \$3,500,000, thus far held in reserve in the vaults of the Bank of England, being the proceeds of a sale of \$6,000,000 of bonds of the Bolivian government in the London market. This result of a protracted course of litigation, vigorously prosecuted by Colonel Church, of New York, on behalf of the American contractors, Messrs. P. & T. Collins, of Philadelphia, and others interested, apparently extinguishes the last hope of ultimate success. Notwithstanding the magnitude of the undertaking, and the fact that the English engineers known as the "Public Works Construction Company" had pronounced the scheme impracticable, Colonel Church and his associates appear to have never lost faith.

An immense quantity of material was sent out to the Amazon River for the construction of the so-called Madeira and Manore Railroad, to cover some 150 miles around the falls of the Madeira River, the main obstacle to the opening of the route. No less than eight cargoes were sent out, mostly by steamers, comprising rails, fish-plates, engines and boilers, locomotives, houses for laborers and a full contractor's equipment, valued at \$300,000, to say nothing of money spent for charters, provisions, &c. The melancholy loss of the steamship Metropolis, which foundered at sea with nearly all on board, will be distinctly remembered. The few laborers who survived and returned to their homes excited a deep sympathy from their pitiable condition. At a later stage of the enterprise—almost exactly one year ago—when the camps on the Madeira River were broken up, the engines tallowed and housed and the men employed returned to their homes, a reporter of *The Iron Age* was favored with an examination of the books in New York—or, rather, the results of an examination—when the facts as to the investment appeared substantially as above. But everything depended on the action of Parliament on the appeal of the bondholders, at the session in March, 1880, of which intelligence has just been received.

What the contractors may now see fit to do for the recovery of the large accumulations of material which were virtually abandoned in the depth of the forest jungles of South America, or to reimburse themselves for the heavy losses sustained, remains to be seen. When it was found that the drafts on England for their payment, sent out from headquarters in New York, were returned dishonored, their predicament was one of extreme perplexity and difficult to be described. It was natural that the good faith of parties in England should be more than suspected, and that jealousy of American enterprise should be imputed, for the fact stood on record in the courts of England that the American litigants could point to two decisions in their favor, including that of the Court of High Chancery, up to the time of the appeal of the bondholders to the House of Lords. The whole affair affords a striking commentary on the uncertain nature of all schemes depending on the caprice of great corporations, or on great engineering feats of difficult accomplishment, especially if the scene of operations be located far from the base of supplies, where tropical heats and all natural laws conspire to insure defeat.

The Hotchkiss Revolving Gun.

Experiments with machine-guns are now in progress both at Portsmouth and Shoeburyness, England, and one particular form of the machine-gun, having found considerable favor in other countries, is now commanding renewed attention in England. It is that which bears the name of the well-known American inventor, Mr. Hotchkiss, and is usually designated the Hotchkiss revolving cannon. This weapon, says the *London Standard*, is distinguished from a mitrailleuse by the circumstance that it fires explosive bullets or small shells, and has a range approaching that of modern field artillery. Its penetrative power against thin steel plates, such as are designed to protect torpedo boats, gives it an especial value. To such an extent is this carried in the Hotchkiss gun, that the new rapid steel cruisers and dispatch vessels which are now being introduced into the British and other navies will not be able to keep out the projectiles of this seemingly insignificant weapon. The form of gun employed for this purpose has a caliber slightly less than two inches, and discharges either a steel shot or a shell weighing nearly two pounds and a half, with a bursting charge of an ounce and a half. Its projectiles are capable of piercing steel plates nearly an inch thick at a distance of more than a mile. The rate of fire would be about 20 carefully-aimed shots per minute, increased to 60 rounds when the object to be hit was near at hand. The gun is in fact a small rapidly-firing cannon. A still larger weapon has been constructed, having a caliber slightly exceeding two inches and firing 30 rounds per minute, the weight of the shell being four pounds, and the initial velocity 1500 feet per second. The former weapon, firing the projectile of two pounds and a half, was made at the request of the French naval authorities, and successful trials are now being carried out with it. These larger specimens of the Hotchkiss gun are as yet exceptional. The type most extensively adopted is one with a caliber of an inch and a half, firing an explosive projectile weighing a pound, with an initial velocity of 1400 feet per second, or a steel shot nearly one-third heavier, with a velocity of about 1200 feet. This gun is mounted on a swivel, with a species of universal joint, and is trained and worked from the shoulder by one man, a second man at the side being employed in feeding the gun with cartridges. So satisfied are the French as to the value of this weapon, that they have already more than 300 of this pattern afloat in their navy, and the number is undergoing rapid increase from the Hotchkiss factory at St. Denis. Each of their larger ships will be equipped with at least 10 of these guns, sockets being fitted both along the bulwarks and in the maintops, to which the guns may be readily shifted as required, so as to concentrate the fire in any given direction. The maximum rapidity of fire with this gun is about 80 rounds per minute; but, where accurate shooting is required, the rate would be from 30 to 35 rounds per minute. Experiments made with the weapon in England, France and Austria show that its projectile is capable of penetrating the steel plating of torpedo vessels of the Lightning class at a range exceeding 2700 yards when striking fair, or about 2000 yards if striking within an angle of 30 degrees. The steel shot will penetrate a steel plate an inch thick at rather more than 200 yards. The French experiments showed that steel plates a quarter of an inch thick were penetrated by the percussion shell at a distance of 3000 yards. Some valuable experiments as to the accuracy of fire with this naval gun have been made in Holland, and the results were deemed to be thoroughly conclusive as to the efficiency of the gun in encountering torpedo boats, however swiftly the latter might make their approach.

The Hotchkiss revolving cannon, in its general form, consists of five barrels, made of Whitworth fluid-compressed steel. These barrels are grouped round a common axis, and are made to revolve in front of a solid, immovable breech-block. This breech-block has an opening in the upper part to introduce the cartridges, and an opening underneath for the exit of the empty cartridge cases, which are thrown out by means of an automatic extractor. The cartridges are fired singly as they present themselves by the rotation of the barrels to the blow of the firing pin, and while resting for an instant motionless in front of the solid portion of the breech. The turning of a crank causes the automatic loading, firing and extraction of the empty cartridge cases. The metallic casing of the cartridge prevents the escape of powder gas at the breech. The mechanism is remarkably simple and strong. There is only one spring in the entire machine—namely, that which projects the firing-pin into the cartridge. The barrels are rifled on the polygroove system, and the arrangement by which the barrels are at rest just before the cartridge is fired permits the gunner to take accurate aim, while at the same time he continues to turn the crank. An extraordinary form of the weapon has been devised for flanking the ditches of modern fortifications, and has been tried in France with remarkable results. This gun is specially constructed to fire canister shot as well as explosive projectiles. Each of the five barrels composing the gun has a different pitch for its rifling. The result is that the cone of dispersion in which the bullets distribute themselves varies, and a dense hail of missiles sweeps along the works, no spot being missed. Thus in one minute, out of 300 dummy soldiers, all but three were hit, the ditch being swept by more than 1800 bullets, flying at every possible angle.

Economy of Rolling Mill Engines.

A subject which deserves a closer and more general attention than has been given to it, is that relating to the economy of power of rolling mills and rolling mill engines. While in our larger and more complete modern iron and steel works progress has far advanced in this direction, and types like the Porter engine are becoming deservedly more popular, many of our minor works are still extremely wasteful. Some remarks made by Mr. Bollé before an English engineering society, are so appropriate and apply so well to the state of affairs in this country, that they deserve being placed before American iron masters. After pointing out in a few words the importance of the subject of his paper, Mr. Bollé stated that the greatest economy of steam would be obtained if the rolls were so constructed that they did their work with the least amount of motive power, and if the motor were constructed so as to produce this power at the least possible cost. The amount of power required by rolls for a certain class of work depended upon the proportions of the rolls themselves, and on the frictional resistance in the bearings and wheels. More attention had lately been paid to the construction of the housings and bearings, especially to arrangements for maintaining the bearings true with each other, and considering the heavy pressure on the roll journals, too much attention could not be paid to this point. As regarded the economical proportions of the rolls for a certain class of work, he was afraid we were still very much in the dark; certain diameters of rolls and series of grooves, having been found to answer in practice, were adhered to, but whether others might not produce the same results with a less expenditure of power, was a point which still required elucidation. It would be necessary for this purpose that indicator diagrams should be taken from a large variety of rolls doing the same work, but unfortunately reliable diagrams could hardly be obtained, and the settlement of the question would have to be deferred to some future date. The motor driving the rolls was usually a steam engine, and it might at once be asserted that the most economical steam engine used for any other purpose would be the most economical engine for rolling mills. It was well known that the greatest economy was obtained by using high pressures of steam and a large degree of expansion, regulated automatically by means of a governor, instead of working with a fixed amount of expansion and throttling the steam before admission to the cylinder. How far these arrangements were applicable to rolling mills remained to be examined. In their general type and arrangement, the engines used in iron works had

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followed the development of the steam engine employed in other works. He was himself in favor of every possible simplicity, but he thought even this might be carried too far, and efficiency and economy ought not to be sacrificed to it. He did not think it was necessary that an engine in such works should be so simple that any laborer could attend to it, and there was no reason could be given against some complication of the mechanism so long as a good mechanic or engineer could master it or keep it in order. To derive the greatest profit from the employment of expansion gear it was necessary that it should be controlled directly by the governor, so as to admit only so much steam as was required for the actual work done. Of course there were objections raised against the employment of automatic expansion gears in rolling mills, but he maintained that the assistance of the engineer for regulating the admission of the steam was only to be retained where very large variations in the power necessary occurred at low speeds, as, for instance, in rolling heavy plates. In this case, however, a governor might still be employed if a sliding weight were arranged on the governor lever which the engineer could easily move by hand. The application of automatic gears to mill engines being proved to be practicable, the next consideration was the most suitable of the various kinds of gear. These might be divided into four classes, the slide valve, piston valve, Corliss and double-beat or equilibrium valve gears. The slide valve expansion gears were the simplest in construction and most readily understood by the persons in charge of the engines, and he considered them preferable to any others up to a certain size of engine, but when they came to large engines the adoption of a different kind of valve gear became advisable from an economical point of view. Next to the slide valves stood the piston valves in point of simplicity. They formed a natural equilibrium slide, but, on the other hand, did not possess the advantage of the flat slides of remaining steam tight, even after considerable wear, by the pressure of steam on their back. Piston valves had been used with advantage in vertical positions, but when in horizontal positions they soon became leaky. They were also badly adapted for the applications of automatic gear. The Corliss valve was undoubtedly one of the most perfect automatic gears. He would, however, question whether this class of gear was particularly suitable for ironworks, its mechanism, in his opinion, being too delicate for the place. The equilibrium valve gears were of an ancient date, and were largely used for all sorts of factories, winding, blowing and pumping engines. They were also used in a less degree in mill engines, and could easily be made automatically expansive. This class of valve gear could be applied to mill engines with very good results, and the objection that it was unsuitable for high speeds was scarcely tenable when they could see a large engine actually running at 70 revolutions per minute. Mr. Bollé, in closing his paper, summed up the conclusions arrived at as follows: 1. Economy in steam was essential for the profitable working of most rolling mills, and could best be obtained by using automatic expansion gears. 2. Such gears could be, and had been, applied to mill engines. 3. For smaller engines: flat slide valve gears were suitable, for large ones double beat or equilibrium valve gear. 4. The economy in steam was increased by the use of condensers, and in connection therewith of compound engines where the coal was dear. 5. Clutch reversing engines were to be preferred to coupled reversing engines, without fly-wheel. 6. In laying out new works, a high steam pressure ought to be adopted.

Notes on Ironwork.

The branch of science which enables the engineer to determine the theoretical amount of strain in the members of any proposed structure may be said to appeal directly to ordinary intelligence, and to be on the whole simple. The science, however, depends upon data and conditions the exact influence of which can never be determined in actual practice.

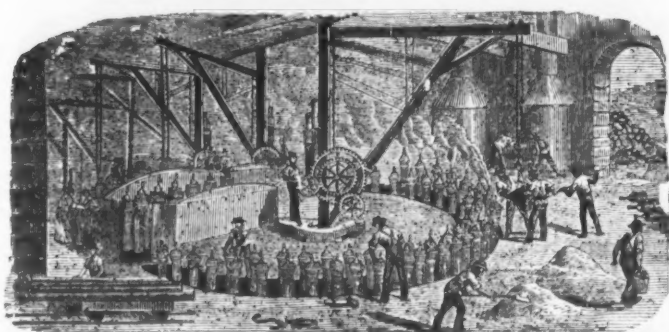
Mr. Graham Smith, in a paper read before an English engineering society, discusses in a popular way some of the practical questions which affect theoretical deductions, and the design, efficiency and economy of ironwork structures generally. The precise conditions under which ironwork will be constructed and worked being indeterminate, it becomes necessary, among other matters, to have some knowledge of workshop practice and routine in order to determine the proper limits and importance to assign to theoretical results.

In taking out strains, it is usually assumed that each member has a normal length whatever the amount of strain to which it is subjected, and that its conditions are the same as they would be were it free to turn in a plane about its extremities. Both of these assumptions are, to a certain extent, erroneous. So far from any bar having a normal length, that is, being perfectly rigid, it may be taken for granted that directly any piece of iron is subjected to a tensile or compressive strain its length is varied accordingly. Likewise, no member of any structure is perfectly free to turn in a plane about its extremities; were it so, each junction would have to be made with an absolutely frictionless pin. In English practice junctions are frequently made with innumerable small rivets, which render them to all intents and purposes rigid. In America, however, pin connections are employed to a very large extent, and undoubtedly, with pins and eyes properly proportioned efficient joints may be made, and, with simple arrangement of parts, theory may be more closely approached than with complicated systems with riveted joints.

Variations in the temperature of the atmosphere likewise materially affect the strains in iron structures. When constructing an iron bridge a camber is given to it, so that when loaded it may assume a straight line instead of exhibiting signs of apparent weakness by sagging. While testing the bridge it is usual to measure the camber as the load is put on, and it is not uncommon to find that on a warm day the camber is

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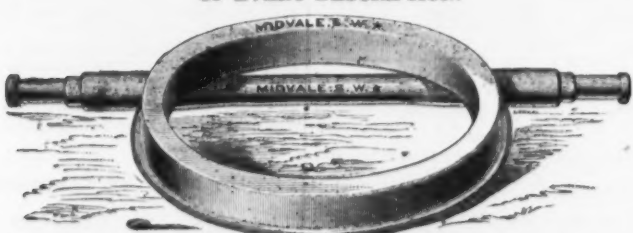
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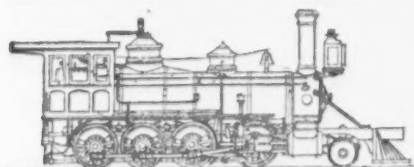
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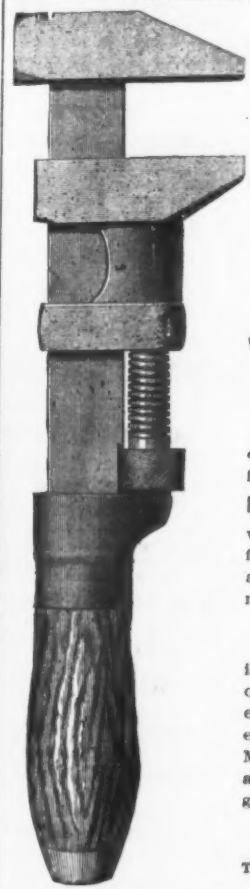
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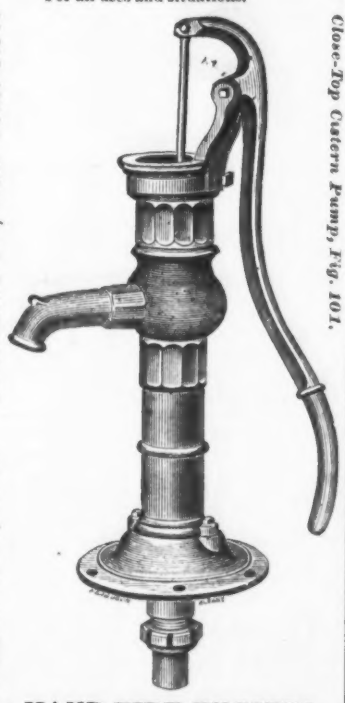
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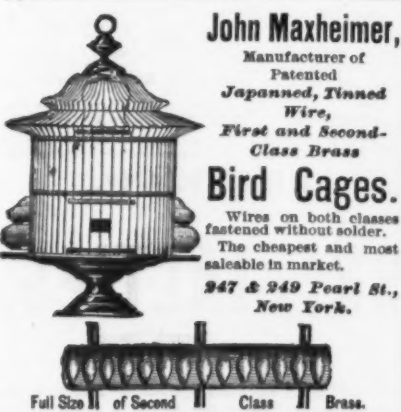
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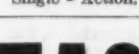
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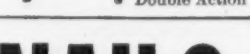
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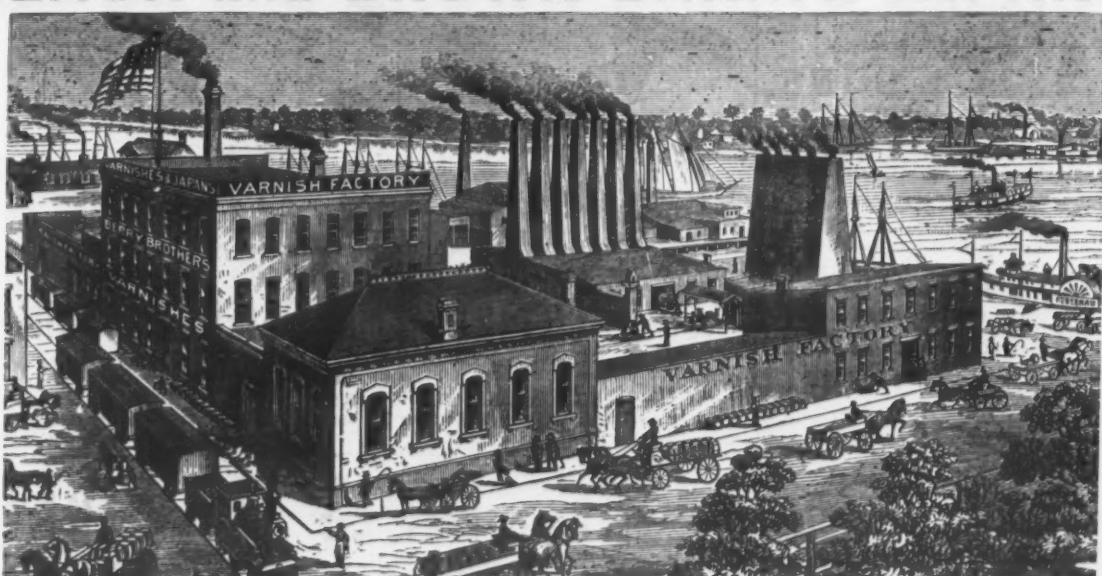


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greater than it was the evening before, notwithstanding that a larger amount of load has been put upon it. This anomaly is due simply to the sun warming up the top flanges, and causing them to extend, while the bottom flanges have not extended to a similar extent, owing to being protected from the sun by a platform or the load upon the bridge. It has been ascertained that a variation of temperature in iron of 15° F. will produce the same effect as one ton actual load per square inch; therefore, a change of 82.5° F. will produce the same effect as 5.5 tons per square inch actual load, which is greater than the amount of strain supposed to be put upon any bar when under its full working load. Now, although the difference between the extremes of temperature in this country may be estimated at 82.5° F., the extreme temperatures only act during a short portion of each 24 hours, and so, owing to the mass of iron and other circumstances, the temperature of the structure is seldom the same as that of the atmosphere, consequently the iron is not affected to the full extent just mentioned. There are, of course, many positions which will fit once suggest themselves where the temperature is tolerably uniform throughout the year, and where, accordingly, no provision need be made for expansion and contraction due to changes of temperature. In exposed positions in England an allowance of 7-16 of an inch in each one hundred feet should be made if it is wished to eliminate strains which it has been shown may be of considerable amount. Edwin Clark has placed it on record that half-an-hour's sunshine has more effect on the tubes of the Britannia Bridge than the heaviest rolling loads or the most violent storms.

Questions of the foregoing nature having been considered, and the strains upon the various members of the proposed structure having been determined within reasonable limits, it becomes necessary to arrange the material to meet them. It is in doing this properly and economically that the art of designing ironwork consists. In all designs every endeavor should be made to employ iron of such dimensions and weights that it may be easily procured in the open market, and require only such workmanship as can be cheaply and readily performed. By attention to these points, economy will be more surely attained than by the saving in the weight of iron which may be effected by adhering more closely to theoretical refinements. As an instance of this, it may be stated that an actual weight of a plate girder is always very much in excess of its theoretical weight, and it is rarely the lightest form of girder which it is possible to design to carry a load; it is yet generally the most economical type to adopt for small spans, owing to the uniformity of its parts and the simplicity of its manufacture. While mentioning plate girders, it may be well to state that, although the theoretical economical depth of all girders depends upon their description, the loads to be carried and a variety of other circumstances, the depth of a plate girder is often fixed by one consideration alone, and that of a practical nature quite beyond the control of the designer. It is simply the fact that plates cannot be rolled at ordinary rates over 4 feet 6 inches in width, so that the maximum depth of ordinary plate girders is fixed at 4 feet 6 inches. If this depth is exceeded, it becomes necessary to plate the web vertically, which will enhance the cost of the work to an extent exceeding the saving likely to result from conforming more nearly to any greater depth which theory might dictate. In arranging the flanges, although theoretically the section of metal should be reduced at certain points, it is generally desirable, when a limited number of girders are to be made from one design, to keep the plates as nearly uniform in thickness as possible, rather than to vary their thickness so as to approach more closely to the amount of metal required to meet the strain. However, where a large number of girders are to be constructed from the same design, the plates may be varied in thickness without increasing in any way the cost of the work, as the plates can be ordered in batches from the rolling mills and relegated to their respective girders in the manufacturers' yards. Extra care should, therefore, be taken to test and thoroughly ascertain the quality of the iron, as it is sometimes very brittle; no attention whatever should be paid to "brand," as it is no criterion by which to judge of the qualities of iron usually employed for the construction of ordinary ironwork. A very fair specification for girder is 20 tons per square inch and six per cent. elongation with the fiber; 18 tons per square inch and three per cent. elongation across the fiber for plates; 22 tons per square inch and nine per cent. elongation for L and T's; and 24 tons per square inch and 15 per cent. elongation for rods and bars. These elongations ought to be taken on a testing section of uniform width for a length of 6 1/4 inches. In a length of 6 1/4 inches there are 100-16ths of an inch, so that each 1-16th elongation after testing represents one per cent. In preparing all samples for testing they should be drilled out of the plate, angle, or bar, and be either chipped or slotted to the required dimensions, and all tool marks carefully filed out, and the parallel portions should run in with curves of large radii to the portions through which the pin holes are drilled. In the event of there being the slightest shoulder at either of these points, it will have the same effect as a nick in the iron, which will generally render worthless the test for both tensile strength and elongation. With a little experience the quality of a plate may be determined to some extent by breaking the corner off over an anvil, and by inspecting the punchings from the plates. If the iron is brittle and untrustworthy, the punchings will show cracks in all directions if the punch is working, as ordinarily, with a little clearance, whereas if the iron is good and reliable slight cracks only will be perceptible, all running in the direction of the fiber. While these workshop tests can be carried out in the manufacturer's yard by the inspection during the progress of the work, all tests requiring to be made with hydraulic presses or steel yards should be conducted by independent authorities. After the material has been tested and passed and the structure put together, it becomes necessary to apply

a proof load, which consists of gradually placing on the structure a weight somewhat exceeding its working load. This is requisite in order to ascertain if the workmanship is up to the proper standard. It must, however, be always remembered that a proof load is not test of the strength of the structure or the quality of the material. If the iron is hard and brittle it will give less than a material of more desirable quality, and the structure will apparently be stronger, but it is needless to state that such is not the case. Again, any part may be on the point of breaking, and yet not yield sufficiently to materially alter the deflection. Likewise, although a structure may stand the application of a proof load at the time of testing, it does not follow that it will stand repeated applications of loads of even less amount than the proof load. Fairbairn's experiments, carried out many years back, demonstrated this fact. He found that when the strain on the iron of a beam was between six and seven tons per square inch, the beam sustained an unlimited number of applications of the load producing this strain; but when the load was increased so as to put a strain of from eight to nine tons per square inch on the iron, the beam failed with a comparatively few applications of the load.

Color Blindness Among Railroad Servants.

Pursuant to an order of Superintendent James McCrea, of the Pennsylvania Railroad Company, the arduous task of examining 5000 employees attached to the line and working on trains and ferryboats, with a view to discover to what extent color blindness prevailed among them, was commenced last week in a room at the depot in Jersey City. Eight or ten men were called in at a time, and were tested in the first place for acuteness of vision, the test card being placed at a distance of about 20 feet from the observer. It was ascertained by this means whether the men's eyes were sufficiently sharp to read small type at the distance mentioned, the result in each case being carefully noted. The next test was for the purpose of discovering whether the men were able to judge of the relative distinctness of objects seen in different positions, and to obtain an accurate knowledge of this the men were directed to look at a quarter inch aperture in a screen 20 feet distant with a strong light behind it, and were then called upon to state in what shape it appeared to them. This test, however simple it may appear to the reader, was by no means so to some of the subjects. What appeared oval to one seemed triangular to another, and vice versa. The color test was then proceeded with, and sixteen of the men who had passed successfully so far came to grief. Three skeins of woolen yarn were used, one being light green, the second rose and the third red, and were marked respectively 1, 2, 3. Each of these was placed on a table in front of the person examined at a distance of 3 feet, and with the vision of either eye obstructed by a spectacle frame, the man under examination was requested to name the color. He was also directed to pick out a similar shade to the one in question from different skeins of woolen yarn, numbered from 1 to 36. One young man correctly designated the test skein as red, but on being told to select a similar shade from the skeins before him he picked three shades of blue, two of yellow and one of red. He could distinguish no difference, and the same thing happened to half a dozen others who followed him. The skeins on the row were then divided into three sets, with twelve numbers in each, and the men were then examined as to color blindness. Some were able to distinguish all the shades of green, but failed lamentably in picking out the different shades of red. The work of examination occupied the greater part of the day, but the importance of the subject has impressed the directors greatly, and it has been decided to apply the test to all engineers, firemen and brakemen in all the branches of the railroad. The Delaware, Lackawanna and Western Railway Company, as well as the Erie Company, have the subject under consideration, and it is likely the system will be adopted on their respective lines.

The New York International Exhibition.—Mr. Kernan's bill to provide for celebrating the one hundredth anniversary of the Treaty of Peace and the recognition of American Independence by holding an international exhibition of arts, manufactures, &c., in New York in 1883 passed the Senate March 31. The bill has been amended so that the corporation which it authorizes shall exist no longer than until the 1st day of January, 1885. Congress, moreover, under the provisions of the bill as amended, may at any time alter, amend or repeal the act creating it, as in its judgment the public good shall require, and the United States shall not be liable for any of the acts, representations, &c., of the promoters of the enterprise. It is further provided that not less than \$1,000,000 shall be subscribed, and not less than 10 per cent. thereof shall be paid in before said corporation shall do any corporate act other than may be necessary to its organization, and no part of the capital stock or assets of said corporation shall be withdrawn by, refunded to, or divided among the stockholders, or any of them, until all the debts or liabilities of said corporation shall be fully discharged.

The rioters at Pittsburgh and other places in 1877, who gained nothing by their violent demonstrations, should make a note of the fact that the Pennsylvania Railroad Company has now restored the old rate of wages without any strike or intimation of an intended strike. They might also profitably employ themselves in figuring out how much sooner the company would have been in a position justifying this advance if its property had not been destroyed and its business paralyzed for a time by the rioters. There are times when wages must be reduced, and times when they should be increased, and though some of the employees (and a great many idlers) failed to recognize this fact in 1877, the company has been commendably prompt to see and act upon it at this time.

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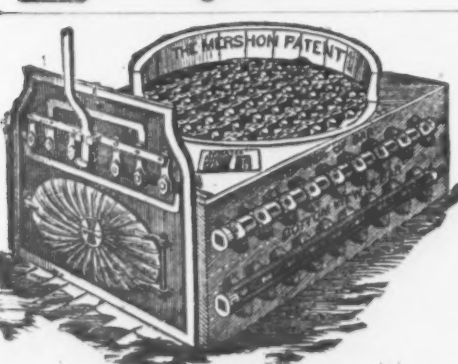
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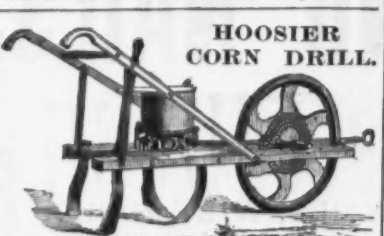
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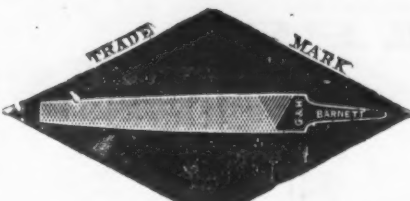
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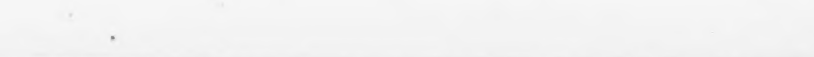
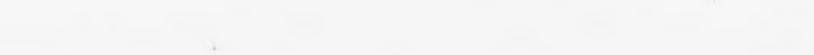
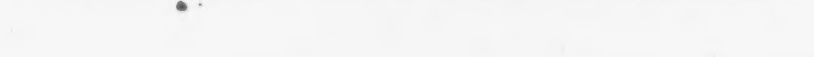
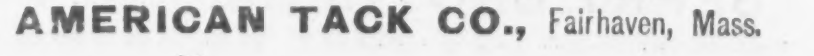
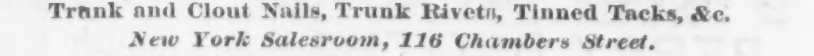
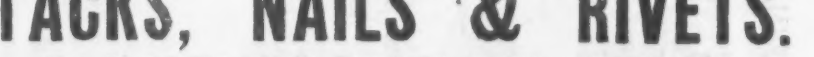
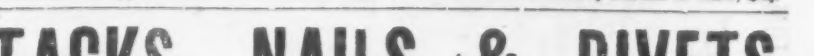
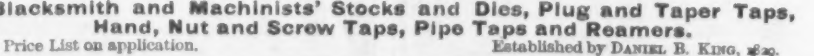
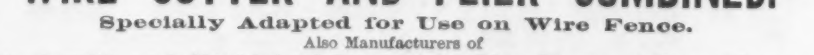
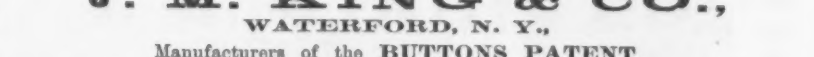
BIT STOCK DRILLS,

Drills for Coes, Worcester, Hunter and other Hand Drill
Presses. Beach's Patent Self-Centering Chucks, Center
and Adjustable Drill Chucks, Solid and Shell Reamers.
Drill Grinding Machines. Taper Reamers, Mill-
ing Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt.

EDWARD S. TABER, Treas.



A. FIELD & SONS,

TAUNTON, MASS.,

MANUFACTURERS OF

AMERICAN AND FRENCH

WIRE NAILS,

TACKS, SHOE NAILS,

And Every Variety of Small Nails.

Offices & Factories at Taunton, Mass.

Warehouse at 78 Chambers St., New York,

where may be found a full assortment of Tacks, Brads, Wire Nails, &c., for the accommodation of the New York Wholesale and Jobbing Trade.

Any variations from the regular size or shape of the above-named goods made from sample to order.

A SILVER MEDAL has been awarded above goods at the Paris Exposition, being the only medal awarded any American manufacturer of Tacks and Wire Nails.

AMERICAN BOLT CO., Lowell, Mass.,

MANUFACTURERS OF

Bolts, Nuts, Washers, Chain Links, Car Bolts, Bridge Bolts, Lag Screws, &c.

Hoisting Machinery

MANUFACTURED BY

CRANE BROTHERS MFG. CO.,
Chicago.

STAR LOCK WORKS.

ESTABLISHED 1836.

Trunk Locks, Door Springs,
Pad Locks, Trunk Stays,
Dead Latches, Keys, &c., &c.

110 South 8th St., and Sansom, bet. 8th
and 9th, PHILADELPHIA.

PATENTED



HILLEBRAND & WOLF.



GEORGE N. PIERCE, Buffalo, N. Y.,
Manufacturer of

Bird Cages, Refrigerators

HOUSE FURNISHING GOODS.

Send for Illustrated Catalogue.
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7th Beekman St., New York City
PHILLIPS, BUTTERFIELD & CO., Agents at Nashville, Tenn.
J. MACLAY & CO., Agents at Dubuque, Iowa.
BUTLER & DIEL, Agents at Syracuse, N. Y.

ALWAYS ASK FOR

ESTERBROOK'S



Steel Pens.

THE MOST POPULAR PENS IN USE.

For Sale by all Stationers.

ESTERBROOK STEEL PEN CO.,
Works, Camden, N. J. New York.

THE ANSONIA CORRUGATED STOVE PLATFORM.

With Patented O. G. Border.

ROUND ZINC.

27, 30, 32, 34, 36 inch.



Cut Showing Round Platform.

THE ANSONIA STOVE REST.



This Cut is the Actual Size of 2-inch.

Manufactured of heavy metal, requiring
no nailing or lining, the edge retaining its
form. Superior pattern, finish and quality.
Price as low as any.

Send for List and Discount.

Packed 12 in each case.

STOVE RESTS are designed to
place under the feet of Stoves
and Ranges, for the purpose of
raising them from the floor or
platform. They are about 1/2-
inch thick, covered with sheet
metal in zinc, brass and nickel
plate. Highly polished and fin-
ished. Packed one set of 4 pieces
in each paper box, and 15 sets in
each case. Sizes (inside of circle
on top)
2, 2 1/2, 2 3/4, 3 1/2 inch.

Send for full Description
and Prices.

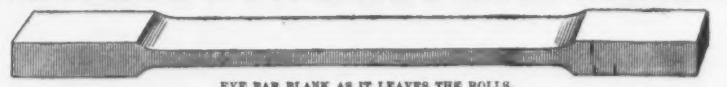
ANSONIA BRASS AND COPPER CO., 19 Cliff St., New York.

ANDREW KLOMAN,

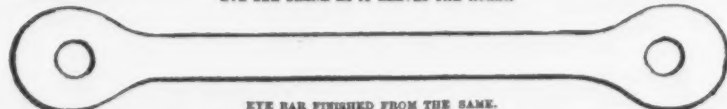
PITTSBURGH, PA.,

MANUFACTURER OF

Steel and Iron Structural Material



EYE BAR BLANK AS IT LEAVES THE ROLLS.



EYE BAR FINISHED FROM THE SAME.

Kloman Patent Solid Rolled Eye Bars, finished in Iron or Steel without welding or "upsetting."
Universal Mill Plates of Iron or Steel. Steel Rails of all sizes and patterns. Splice Bars.
SPECIALTY—Unusual shapes and sizes in Steel or Iron; Angles, Tees and other structural shapes in
Iron or Steel.

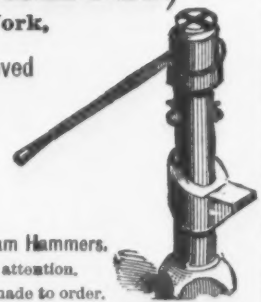
RICHARD DUDGEON,

No. 24 Columbia Street, New York.

Maker and Patentee of the Improved

Hydraulic Jacks

AND
Punches.



Roller Tube Expanders and Direct Acting Steam Hammers.

Communications by letter will receive prompt attention.

Jacks for pressing on Car Wheels or Crank Pins made to order.

EVERY PUTNAM NAIL

is drawn down to a point from the rod, thus:

It is the only Hot Forged and Hammer Pointed Horse Shoe Nail, made by ma-
chinery, in the World.

Some other manufacturers claim to make a hot forged Nail, but you will observe on all such a
beveled edge near the point.

F. O. Address, Neponset, Mass., U. S. A.

THE PUTNAM NAIL CO., Boston.

The "Common Sense" Band Cutter.

We show in the accompanying cut a little
mechanical device of much utility in the
agricultural districts. The general use of
wire and twine for binding grain reaped by
machinery has made it desirable to have
some easier and better means of cutting and
removing the bands from sheaves than has
hitherto been used. Especially when wire
is used it is necessary that the band should
be completely removed, as any lots of wire
remaining makes trouble in the thrashing
machine, and if it follows the grain to the
mill gives rise to more serious danger there.
The device we show is commonly known as
"the push and pull cutter," and works
equally well with wire or twine. The point
of the instrument is thrust into the bundle
until the band is caught by the hooked pro-
jection. The motion is then reversed, as if
to pull the point out again. By this motion
the band is drawn into the cutter, which
cuts it but does not let it go. One of the
ends of the cut band is firmly held so that
the band is pulled away entire, leaving no
pieces behind. By pushing the point against
a board standing in a box or barrel pro-
vided to receive the bands, the wire or
twine is released and the cutter reset. It
works easily, and does not disturb the straw
nor tire the hand. It is made wholly of
steel, except the wooden handle, and seems
to be very desirable. Graham & Haines,
113 Chambers street, New York, are the
sole agents.

Wharton's Nickel Salts and Cast Nickel Anodes and the Adams Patent.

It has been generally believed by those in-
terested in nickel plating, that the nickel
salts and cast-nickel anodes manufactured by
Joseph Wharton, at Camden, N. J., were
made according to the method described in
Dr. Adams' patent. They have been manu-
factured largely for the United Nickel Com-
pany, and Mr. Wharton has protected the



THE "COMMON SENSE" BAND CUTTER.

United Nickel Company by charging out-
siders the prices demanded by the company
of their licensees. It has more than once
been proposed to place Mr. Wharton on the
witness stand to testify on this point, as
some shrewd parties in interest have sus-
pected that possibly he could throw some
light on the subject of the value of Dr.
Adams' claims; but Mr. Wharton has uni-
formly declined to make an affidavit, or to
give any testimony which would make it
worth the while of those opposed to the
United Nickel Company to summon him.
But he now seems to look at the matter
from a somewhat different standpoint—per-
haps because, under the new arrangement
made last year, the United Nickel Com-
pany's supplies are drawn from other sources.
In the pamphlet containing the testimony in
the case of the United Nickel Company vs.
Hartman, of Philadelphia, we find the fol-
lowing interesting affidavits by Joseph
Wharton and Mr. Fred. Voight, a well-
known chemist in his employ:

THE UNITED NICKEL CO. } U. S. C. C., Oct. Sess.,
vs. } 1879, No. 57.
JOHN HARTMAN. } In Equity.

JOSEPH WHARTON, being duly affirmed ac-
cording to law, says:

I am proprietor of the American Nickel
Works at Camden, New Jersey. I have
been actively engaged in the manufacture
of pure nickel and nickel compounds for
about 15 years. In 1866 I had methods for
the manufacture of the double sulphate of
nickel and ammonia, and the double chloride
of nickel and ammonium, and also for the
casting of nickel anodes. These methods
were entirely different from those described
in the patents granted to Isaac Adams, Jr.,
dated Aug. 3, 1869, May 10, 1870, and April
11, 1871, and all the double sulphate of nickel
and ammonia and the double chloride of
nickel and ammonium (called nickel salts),
and all the anodes made by me, have been
made according to my own methods, and not
in any case according to the methods pat-
ented by Isaac Adams, Jr., all of whose pat-
ented processes are intrinsically injudicious
or even absurd, considered as practical
working methods. From 1869 to within a
year or two past I manufactured and sold
in quantities, from time to time, to the
United Nickel Company the double sulphate
of nickel and ammonia, and cast nickel
anodes. The anodes made for them by me
were, by their direction, cast with the
name "The United Nickel Company" in
raised letters on each casting, which in-
scription I considered as their card or
advertisement; but the anodes so made for
the United Nickel Company were made in
exactly the same manner as those made for
any other customer, and not in any case ac-
cording to the patents of Isaac Adams, Jr.

Affirmed and subscribed before me
the 27th day of January, A. D.,
1880.

FRANK A. MULLIKIN,
Notary Public.

THE UNITED NICKEL CO. } U. S. C. C. In Equity.

JOHN HARTMAN.

FREDERICK VOIGHT, being duly sworn,
says:
I am a practical manufacturing chemist,
37 years of age. I studied practical chemis-
try and metallurgy in Elberfeld, Prussia,
and worked as a practical manufacturer for

the firm of Fleitmann & Witte, at Iserlohn,
Prussia, for several years. I am now super-
intending chemist for the American Nickel
Works, Camden, N. J., Joseph Wharton,
proprietor. I came to this country in 1866,
and know that practical nickel plating was
carried on in Germany and elsewhere before
I left Europe. Before leaving Prussia, and
while in the employment of Messrs. Fleit-
mann & Witte, I cast nickel anodes for that
firm, which were used as anodes for nickel
plating; I also, while with that firm, un-
derstood the manufacture of the double salts of
nickel and ammonia; I have also manu-
factured the double sulphate of nickel and am-
monia, and cast nickel anodes since coming
to this country in 1866 for my employer,
Joseph Wharton, Camden, N. J., in whose
employment I then entered, and have ever
since continued. I supervised for him the
manufacture of these double salts of nickel,
and cast nickel anodes for the United Nickel
Co. in large quantities, from time to time,
up to within about a year ago; these double
salts of nickel and cast nickel anodes were
made according to our own methods and
formulas, and not according to the methods
described in the patents granted to Isaac
Adams, Jr.

The anodes made by us for the United
Nickel Company were cast with the name
of "The United Nickel Company," and the
date of patent or patents, in raised letters
on each casting.

I have read the first claim of the patent
to Isaac Adams, Jr., of August 3, 1869.
The requirement in this claim that the solu-
tion shall be so prepared as to be free from

potash, soda, alumina, lime or nitric acid,
amounts to nothing, because the double sul-
phate of nickel ammonia made from good
marketable nickel and good sulphate of
ammonia, will not show the presence of
potash, soda, alumina, lime or nitric acid.

And the requirement in this claim that
the solution made from these double nickel
salts shall be free from any acid or alkaline
reaction cannot be fulfilled. In fact, no
solution made from these double salts of
nickel can be made so as to be free from
any acid or alkaline reaction.

It is the inherent chemical property of an
unadulterated solution of such neutral salts
to show acid reaction.

I have also read the second claim of Isaac
Adams, Jr.'s patent of August 3, 1869. The
combination of iron with nickel will not pre-
vent the deposition of arsenic and copper
with the nickel, nor protect the solution, as
it is alleged and claimed by this patent. In
fact, the iron so combined with the nickel,
alloys the nickel and thus leaves less nickel
in the anode to keep up the saturation of
the solution, and, consequently, the solution
becomes weakened and impaired.

I have read the extracts from the works
of Prof. Boettger and from the works of
Prof. Becquerel, which are annexed to the
affidavit of Prof. James C. Booth, in this
suit. The descriptions of the methods given
in these extracts describe substantially the
same methods as those set forth in the pa-
tent granted to Isaac Adams, Jr., of August
3, 1869, and will enable any one (without
further invention) who has ordinary skill
and knowledge of chemistry, practically to
do nickel-plating by the electro-deposition of
nickel by means of the solution of the sul-
phate of nickel and ammonia and the double
chloride of nickel and ammonium, prepared
as described and directed in those extracts.

I have also read a work published in 1860
by George Griffin & Co., at London, Eng-
land, written by George Gore, in which a
method for the electro-deposition of nickel
by means of a solution of the double chloride
of nickel and ammonia and the use of a
nickel anode, is clearly and fully described,
sufficient to enable any one of ordinary skill
and knowledge in chemistry to do nickel-
plating practically and successfully.

FRED. VOIGHT.

Sworn and subscribed before me the

27th day of January, 1880.

[SEAL.] B. J. WEYLL, Notary Public.

Anthracite Coal in Shenango Valley
Furnaces.—Mr. J. J. Pierce, one of the most
prominent pig iron manufacturers in the
Shenango Valley, informs the Bulletin that
for the past two months a majority of the
furnaces in that section have been using
from one-fourth to one-half anthracite coal
as a mixture with raw block coal and Con-
necticut coke. He says the result has been
very satisfactory, both as to cost and work-
ing.

Champlain Ore.—Messrs. Witherbees,
Sherman & Co. have issued a circular from
which we extract the following: "We shall
offer for sale this season the product of our
Old Bed mine, as well as that of the Port
Henry Iron Ore Company's 21 mine, at the
following prices, under the name of 'old
bed 21' ore: Selected lump for puddling,
\$6.50 per ton of 2240 pounds. Screened ore
for forges, \$6 per ton of 2240 pounds. Fur-
nace ore, \$5.50 per ton of 2240 pounds."

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of
PEN AND POCKET CUTLERY,
Solid Steel Scissors, Shears, Razors, &c.
Sole proprietors of the renowned full concave
"ELECTRIC RAZORS,"
And the celebrated "ELECTRIC SHEARS." Nickel Plated
Bows.
Agents for the BENGAL RAZORS.
AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.
91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.
MERIDEN CUTLERY COMPANY.

THE "PATENT IVORY" HANDLE TABLE KNIFE.
The oldest manufacturers of Table Cutlery in America. Exclusive makers of the CELLULOID HANDLE
for Table Cutlery. A most beautiful and perfect substitute for Ivory. Also makers of all kinds of TABLE,
BUTCHER AND HUNTING KNIVES. Illustrated catalogues with prices sent to the trade on application.
SALESROOM, No. 49 Chambers St., N. Y. Address all communications to West Meriden, Conn.

THE
LAMSON & GOODNOW
88
CHAMBERS ST.
MFG. CO.
N.Y.
AMERICAN TABLE
CUTLERY & C.

AARON BURKINSHAW,
Manufacturer of Pen and Pocket Cutlery, Pepperell, Mass. Established 1853.
My Blades are forged by hand from the best Cast Steel, and warranted. To me was awarded the Gold
Medal of the Conn. State Agricultural Society.

The Celebrated VICTOR Cast Shear
SOLD EVERYWHERE BY HARDWARE DEALERS EVERYWHERE.
WHERE Special Attention given to orders for export.
The largest Manufacturers of Cast Shears in the World.
Manufactured only by
THE RENZ HARDWARE CO.,
BRIDGEPORT, CONN. U.S.A.
Fine Gray Iron Castings.
Fine Plain and Ornamental Metal Patterns made
to order at our new foundry, Knowlton St., E. D.
Address
THE RENZ HARDWARE CO.,
Bridgeport, Conn.

HENRY SEYMOUR CUTLERY CO.
Manufacturers of Full Nickel Plated and Maroon Japan Handle
SHEARS AND SCISSORS.
Every pair warranted. Sold by Hardware Dealers throughout the country.
Salesrooms, 84 & 86 Chambers Street, New York City. Manufactory, HOLYOKE, MASS.

JOHN WILSON'S CELEBRATED
TRADE MARK.
FOUR PEPPERCORNS AND A DIAMOND.
BUTCHERS' KNIVES,
BUTCHERS' STEELS,
AND
SHOE KNIVES.

It having come to the knowledge of
JOHN WILSON that Counterfeit Butchers'
Knives, purporting to be of his manufacture,
are being sold in the United States, he here-
by cautions all purchasers of his Knives and
Steels to be on the alert against such im-
position.
JOHN WILSON also hereby gives Notice,
that it is his determination to institute Legal
Proceedings against any person or persons who
may be detected infringing his Trade Mark.
Every article of JOHN WILSON'S manu-
facture, bears the Trade Mark, in addition to
the Name.
WORKS: SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.

BUCK BROTHERS, Millbury, Mass.
The most complete assortment in the U. S. of
Shank, Socket Firmer and Socket Framing Chisels,
PLANE IRONS.
Gauges of all lengths and circles beveled inside and outside. Nail Sets, Scratch and Belt Awls,
Chisel Handles. A full stock of Carving Tools. Also, small boxes of Tools of best quality.

Wood Workers'
Clamps,
To open 2, 3, 4, 5, 6, 7,
8 and 10 inches.
Strongest and Best Clamp Made.
Malleable Ox Shoes
with
Steel Converted Toe Calk.
Five sizes.
CARRIAGE HARDWARE,
IVES, WOODRUFF & CO, Manufacturers,
(Send for Catalogue.) MT. CARMEL, CONN.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,
Butchers' Choppers,
Axes and Hatchets,
Grab Hoes and Mattocks,
Mill Picks,
Box Chisels and Scrapers,
Ring Bush Hooks,
Ax Eye Bush Hooks,
Socket Bush Hooks,
Watt's Ship Carpenters' Tools,
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Coopers' and Turpentine Tools.

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Cutlery.

ALFRED H. HILDICK,
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Importer of CHAINS, ANVILS, VISES, &c.
Agency of
HILL BROTHERS & CO., WALSALL, ENGLAND
GENERAL HARDWARE MERCHANTS,
And of
BALL'S PAT. SOLID STEEL SHEEP SHEARS.
These shears are unsurpassed for cheapness, dura-
bility and utility. They are made of one solid piece
of steel from point to point, and cannot be broken in
use either in the bow or at the junction of the shank
and blade. Samples can be seen at above address, or
sample lots furnished.

CORPORATE MARK,
* * *
Joseph Rodgers & Sons'
(LIMITED)
CELEBRATED CUTLERY,
No. 82 Chambers Street, New York.
F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons'
productions having considerably increased, they
have, in order to meet it, greatly extended their
Manufacturing Premises and Steam power.
To distinguish Articles of Joseph Rodgers
& Sons' Manufacture, please to see that they bear
their Corporate Mark.

P. O. Box 3962.
ESTABLISHED 1836.
Alfred Field & Co.,
COMMISSION MERCHANTS,
New York, Birmingham, Sheffield, Liverpool.

Guns and Pocket Cutlery,
SPECIALITIES.

Headquarters for
ELEY'S BROS. GOODS, WRIGHT'S ANVILS,
WILSON'S BUTCHER KNIVES, &c.
WOSTENHOLM'S POCKET CUTLERY AND RAZORS,
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STUBS' FILES, WESTERN FILES,
GREAVES' SHEEP SHEARS,
CHESTERMAN'S TAPES,
GERMAN COIL AND HALTERS and other CHAINS.
BRADEN'S TROWELS AND HOES,
CANASTOTA KNIFE CO.'S POCKET KNIVES.
Etc., Etc., Etc., Etc.

All sorts of Hardware and Merchandise for im-
port and export purchased on commission.

ROBERT SORBY & SONS,
SHEFFIELD,
MANUFACTURERS OF THE CELEBRATED

Kangaroo Sheep Shears,
The best
CORPORATE MARK
Every
Shears
made.
Guaranteed.

ALFRED FIELD & CO.,
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SOLE AGENTS.
Send for price list and terms.

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McCOY & CO.,
IMPORTERS OF

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CELEBRATED

Pocket Knives and
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A large stock of
Muzzle & Breech Loading
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Silver Medal, 1878-Paris.
J. R. SPENCER & SON,
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MANUFACTURERS OF
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Table Knives, Razors, Shovels, &c., &c.,
of every description.

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Granted 1749.

SCHRODER LOCK CO.,
Manufacturers of
BUILDERS' HARDWARE,
Locks, Latches,
HINGES,
AND
BRONZE & BRASS GOODS
Of all kinds.
JAIL LOCKS.
Office and Works,
16 & 18 East 7th Street,
CINCINNATI, OHIO.
A liberal discount to the
trade.

PHENIX CASTOR CO.,
INDIANAPOLIS, IND.

Send for Illustrated Catalogue.

Shipped as nuts and bolts, at very low rate of freight.
Painted
Vermillion
Red.
Tucker's Incomparable
ADJUSTABLE
STOVE TRUCK.
Packed
One Dozen
In a box.
Patented,
Feb. 13, 1872.
Oct. 1, 1878.
July 1, 1879.
Eight thousand sold the first year.
TUCKER & DORSEY, Mfrs.,
Indianapolis, Ind.

LIGHTNING
STUMP PULLER,
M. E. BUNGER & Co.,
Manufacturers,
Indianapolis, Ind.
Observe what absolute
power—prying up on
one chain and down
on the other.
Fulcrum 14 1/2 inch
in short bid.
Fulcrum length-
en 3 at pleasure
a stump gives
it up, thus add-
ing 2 speed as
desired.
Send for
Illustrated
Circular and
Prices.
We make TILL either for
Cows or Sheep.
Can be applied to
any implement,
either with or
without tongue.
Light, Strong
and
Simple.
M. E. BUNGER & Co.,
Indianapolis, Ind.
Makers.
A perfect Double Tree
A perfect Equalizer
A perfect Stretcher.
Send for Price and
Illustrated Circular.
The best selling implement in America. Make its acquaintance by sample order in time for spring trade.

Hardware Novelties, Glass Cutters, &c.
GEO. M. EDDY & CO.,
Manufacturers of
Measuring Tapes
Of Cotton, Linen & Steel.
FOR ALL PURPOSES.
351 to 353 Classon Ave., Brooklyn, N. Y.
CHAS. E. LITTLE,
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Solid Cast-Steel Pump Augers
For Boring Pump Legs and Pump
Tubing, with all necessary fittings. Agency for
Barnes' Wood-Working Machinery
and Lathes.

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PAT. DEC. 26, 1871.

Established in 1839.

A. G. COES & CO.
WORCESTER,
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Successors to
L. & A. G. Coes,
Manufacturers of
THE GENUINE
COES
Screw
Wrenches.

PATENTED,
May 2, 1871.
December 20, 1871.
December 28, 1875.
August 1, 1876.

The backstrain when the wrench is used is borne
by the bar—not by the handle.
The strongest Wrench made, and the only suc-
cessful Re-enforced Bar.
None genuine unless stamped

A. G. COES & CO.,
Our Agents, GRAHAM & HAINES, 113 Chambers St.,
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pleased to serve you at factory prices.

CLOTHES WRINGERS.

Self-Adjusting
Steel Rupture Spring.
"EUREKA"
WRINGER.
BOSTON.

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BOSTON, MASS.

CLARK'S RUBBER WHEELS.

This wheel is the
best now in the
market, and is at-
tracting the atten-
tion of large manu-
facturers on ac-
count of the great
saving of floors,
which is ten times
greater than the
extra cost of this
wheel.
Adapted to all purposes, viz. Warehouse trucks,
platform trucks, scales, boxes, baskets and heavy
carts. For full particulars see the first issue of The
Iron Age next month, or address
GEO. F. CLARK, Windsor Locks, Conn.

SUPERIOR QUALITY
North Carolina
MICA.

We are prepared to furnish
Stove Manufacturers,
Oil Stove Manufacturers,
Jobbers and Retail Dealers,
WITH
MICA
of very best quality.
Estimates furnished on application.
J. S. & M. PECKHAM,
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Miners and Wholesale Dealers in Mica.

JAMES COMLY,
4739 Paul St., Frankford, Philadelphia, Pa.,
Manufacturer of

Hardware Novelties, Glass Cutters, &c.

GEO. M. EDDY & CO.,
Manufacturers of
Measuring Tapes
Of Cotton, Linen & Steel.
FOR ALL PURPOSES.
351 to 353 Classon Ave., Brooklyn, N. Y.
CHAS. E. LITTLE,
59 Fulton St., N. Y.

Solid Cast-Steel Pump Augers
For Boring Pump Legs and Pump
Tubing, with all necessary fittings. Agency for
Barnes' Wood-Working Machinery
and Lathes.

THE WM. ROGERS MFG. CO., MANUFACTURERS OF Superior Electro Silver-Plated Table Ware



WM. ROGERS,
Senior Member and Manager of ROGERS BROTHERS.
On Knives.



F. WILLSON ROGERS,
Son of the late Wm. Rogers.
On Hollow Ware.



Our Knives are guaranteed TO STRIP 12 dwts. of Silver per Dozen. All goods are put up one dozen in a box. All our Knives are put up in the latest and most attractive style, with guarantee card in every box.

WM. ROGERS & SON, A. A.

Our Spoons, Forks, etc., are guaranteed TO STRIP On Tea Spoons, 48 dwts. per gross. On Dessert Spoons and Forks, . . . 72 dwts. per gross. On Table Spoons and Medium Forks, 96 dwts. per gross.

ALL OTHER GOODS IN PROPORTION. All our Spoons, Forks, etc., are plated upon 15 PER CENT. NICKEL SILVER. The best base known for plating upon.



Our Hollow Ware is plated upon the FINEST WHITE METAL, and is guaranteed to be plated fully 80 Per Cent. More Silver than any other brand of goods in the market.

OUR GOODS ARE PLATED 20 PER CENT. ABOVE STANDARD PLATE.

P. O. Address, Drawer 30, Hartford, Conn.

Depot, No. 100 Chambers Street, New York.

HALL, ELTON & CO., Electro Plated Ware, German Silver and Britannia Spoons.



THE "EASTLAKE." (Patented.)

Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.



FORKS, SPOONS, Etc.,
Manufactured from Cast Steel, Plated with Nickel and Silver,
WALLACE BROTHERS, Wallingford, Conn.

THE HOWE SCALE CO., Improved Scales & Weighing Machines of every Variety.

OFFICES:

PAGE, FARGO & CO., 325 Broadway, New York.

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J. FRED. DENNIS, 8 & 9 Holborn Viaduct, London.

PAGE, FARGO & CO., 63 Wood Street, Pittsburgh, Pa.

Works at Rutland, Vt.

SCUTT'S



PATENT

Four Pointed Steel Barbed Cable Fence Wire,
Manufactured by H. B. SCUTT & CO., Buffalo, N. Y.
(See Monthly Iron Age.)

HOLMES, BOOTH & HAYDENS, MANUFACTURERS OF

Finest Quality Silver-Plated Spoons, Forks, Knives, &c.



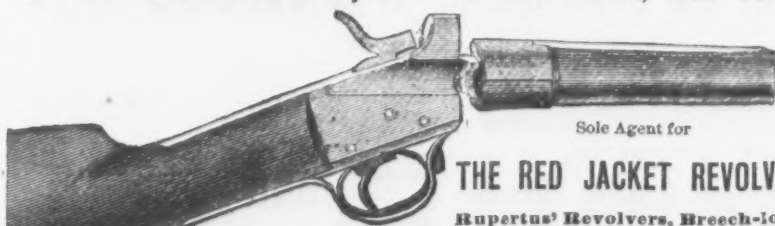
NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 12 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

49 CHAMBERS ST.,
NEW YORK.

Factories,
WATERBURY, CONN.

18 FEDERAL ST.,
BOSTON.

T. G. CONWAY, 90 Chambers Street, New York,

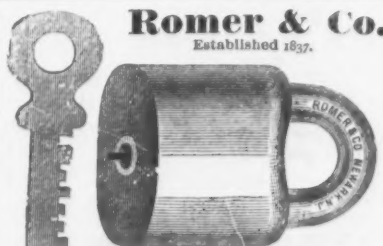


Sole Agent for

THE RED JACKET REVOLVER,

Rupertus' Revolvers, Breech-loading Shot Guns and Rifles; Nichols Cutlery Co.'s Table Knives and Forks; Star Cutlery Co.'s Pocket Knives.

Rupertus' Single Breech-Loading Shot Gun, Twist Barrel.



Romer & Co.
Established 1837.

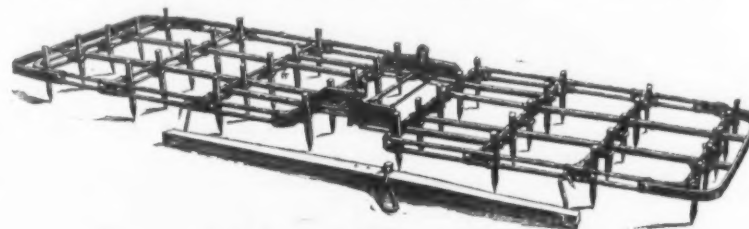
Manufacturers of Patent Scandinavian or Jail Locks. Brass Pad Locks for Railroads and Switches. Also Patent Stationary R. R. Car Door Locks. Patent Piano and Sewing Machine Locks. 141 to 145 Railroad Avenue, NEWARK, N. J. Illustrated Catalogue sent to the trade on application.

Roger's "Duplex" Harrow.

The accompanying cuts represent an improved harrow, manufactured by M. E. Bunker & Co., Indianapolis, Indiana. The construction of this implement will be readily understood from the figures. It consists essentially of two frames, connected by a flexible hinge. The teeth are fastened to the frame rods in such a way that they can be readily adjusted. They can be placed in any position on the frame rods, and can also be set at any angle, according to the nature of the soil. Fig. 1 shows the harrow ready for use in the field. When on the road it is folded as shown in Fig. 2, thus forming a sort of sled, and keeping the teeth from contact with the road. The harrow, with the exception of the shoes or runners, is made entirely of 1/4-inch iron, the rods being firmly bolted together. The teeth are of steel. The flexible hinge enables the implement to adapt itself to the inequalities of the ground, and the teeth being reversible, are self-sharpening. It is claimed they can be used until only 2 1/2 inches long.

Iron Receipts at Pittsburgh.

The following tables will furnish the reader with a correct account of the receipts of iron for the past three months; also comparative tables with previous years. These include pig iron, blooms and billets, muck bar, iron ore, cinder, scrap iron and



ROGER'S DUPLEX HARROW.—Fig. 1.

old rails. An examination of these details will show the marvelous growth of the iron trade of Pittsburgh. We may instance a single railroad, the entire receipts of which for the 12 months of 1877 amounted to 20,913 tons. During the three months ending March 31, this year, the same road has delivered the following lots: Iron ore, 36,608 tons; scrap iron, 4416 tons; pig metal, 11,880 tons; old rails, 6988 tons; blooms and billets, 1080 tons, making a total of 60,964 tons, or 40,051 tons more than the entire receipts of 1877. There has been a very material increase on other roads. The increase for the past three months exceeds the

ing machines. Among their recent orders are one for three 6-inch machines for Allison & Co., Philadelphia; one for two 4-inch sewing machines for A. M. Byers & Co., Pittsburgh, and one for one 8-inch threading machine for the Cambria Iron Works, Johnstown, Pa.

The Jefferson Iron Company, of Antwerp, is preparing to put its iron furnace at Sterlingville in blast. The one at Lewisburg is making 6 tons of pig iron a day.

NEW JERSEY.

The Warren Furnace, at Hackettstown, was lighted up some time ago. It is reported that several important improvements are to be made by the furnace company.

The Ferracute Co., of Bridgeton, build about 50 different styles and sizes of foot and power presses and also spinning lathes, dies of every description for sheet metal work, and a full line of canner's tools. They are now building a new power embossing press for extra heavy work such as watch cases, knives, forks and spoons; nuts, washers, &c. They have lately issued a handsome 48-page catalogue and price list.

PENNSYLVANIA.

The Richmond Furnace, at Richmond, Franklin County, has been put in blast, and is turning out a superior quality of foundry iron.

The Philadelphia Ledger states that the famous Southwark foundry, which covers the block at Fourth street and Washington avenue, formerly known as "Merrick's Foundry," has been sold by its present owners, Merrick & Sons, to a company of capitalists. These have acquired the patents of the Porter-Allen high speed engine, which promises, from experience at some of the largest rolling mills in the State, such as the Cambria Iron Company of Johnstown and the National Tube Works at McKeesport, to be one of the engines of the future. The new concern, it is understood, starts with a large number of orders on hand, which are expected soon to tax to the fullest extent the capacity of the works, large as it is.

The most recent improvement in steel making in this country is the introduction of the Pernot Furnace. The method of manufacture is too well known to our readers to require description. With the exception of the rails made by this process at Springfield, Ill., the only place where these furnaces are in use in this country is at the steel works in Johnstown, where are located two mills with a capacity of 40,000 tons per annum. This product is entirely controlled by the Gautier Steel Company, who are perfecting arrangements to roll this amount without decreasing their production in other grades.

The two furnaces of Wm. H. Clymer & Co., the Temple and the Mount Laurel, near Temple, Berks County, are in operation, and are doing very well.

The Lebanon Manufacturing Company, at Lebanon, is at present engaged on an order for 26 engines of different sizes. They also have an order for 850 box freight cars, which they expect to have completed in about four months. They report that they are full of furnace and other general work.

The rolling mill and other property of the Hope Iron Company, of Pottstown, have been purchased by the Pottstown Iron Company, and were started up under the new management on the 29th ult. It is understood that all or nearly all of the Hope employees will be retained. Rumor has it that the Hope Iron Company will buy ground elsewhere and erect a larger mill.

The Messrs. Matheson, late of the National Tube Works Company, of McKeesport, in connection with Mr. Jas. Young, of Middletown, Dauphin County, have bought the Middletown Pipe Works, and will enlarge the same, and go into operation at an early date. They will commence the erection of an improved lap weld mill at once, and also have in contemplation the erection of a rolling mill to make special iron for tubes. The firm is known as the American Tube and Iron Company.

The two blast furnaces of the Westernman Iron Company, at Sharon, started up on the 23d ult., and are both working well.

The furnace of the Warwick Iron Company, of Pottstown, was put into blast on

ROGER'S DUPLEX HARROW.—Fig. 2.

receipts of last year for the same time 94,576 tons. These reports are taken from statistical records, which are posted every day, and are open for inspection if any one has any doubt of their correctness:

RAW IRON RECEIPTS FOR THE PAST FOUR YEARS.

| | 1877. | 1878. | 1879. | 1880. |
|-----------------------|--------|--------|--------|--------|
| Pig iron..... | 24,424 | 19,230 | 18,807 | 40,526 |
| Iron ore..... | 14,595 | 18,790 | 25,278 | 38,528 |
| Scrap iron..... | 2,730 | 2,558 | 8,401 | 6,133 |
| Blooms & billets..... | 324 | 1,572 | 2,908 | 1,005 |
| Old rails..... | | 448 | 324 | 11,468 |
| Cinder..... | 36 | 876 | 978 | 1,044 |
| Muck bar..... | 300 | 348 | | 342 |
| Total..... | 40,345 | 40,828 | 56,724 | 99,100 |

| | 1877. | 1878. | 1879. | 1880. |
|-----------------------|--------|--------|--------|--------|
| Pig iron..... | 21,310 | 19,254 | 20,177 | 37,976 |
| Iron ore..... | 13,710 | 24,378 | 24,080 | 24,041 |
| Scrap iron..... | 5,612 | 4,347 | 3,560 | 5,795 |
| Blooms & billets..... | 876 | 3,559 | 3,619 | 1,620 |
| Old rails..... | | 96 | 1,131 | 8,335 |
| Cinder..... | 36 | 914 | 1,206 | 1,521 |
| Muck bar..... | 478 | 60 | | 180 |
| Total..... | 42,042 | 52,068 | 53,833 | 79,438 |

| | 1877. | 1878. | 1879. | 1880. |
|-----------------------|--------|--------|--------|--------|
| Pig iron..... | 3,417 | 24,439 | 19,353 | 33,002 |
| Iron ore..... | 23,311 | 21,201 | 34,379 | 37,453 |
| Blooms & billets..... | 704 | 2,500 | 2,432 | 4,171 |
| Cinder..... | 783 | 4,080 | 1,116 | 3,183 |
| Muck bar..... | 480 | 188 | | |
| Scrap iron..... | 4,114 | 5,184 | 8,810 | 4,006 |
| Old rails..... | | 3,936 | 5,011 | 8,053 |
| Total..... | 50,884 | 63,130 | 63,333 | 89,548 |

RECAPITULATION.

| | 1877. | 1878. | 1879. | 1880. |
|---------------------|---------|---------|---------|---------|
| Raw iron rec'd..... | 114,150 | 156,966 | 173,890 | 268,460 |

—Pittsburgh Dispatch.

A Mexican Telegraph Company Organized in New York City.—A company recently organized in New York, of whom the public as yet have little information, are running a line of submarine cable from Brownsville, on the southern coast of Texas, directly to Tampico and Vera Cruz, from thence across the Isthmus of Tehuantepec (on the line of the road proposed by Mr. Larned and his associates, and of which 15 miles will be ready for the rails now on the way), continuing down the coast as far as Ecuador via Nicaragua, Costa Rica and Panama, connecting with all land lines through those republics. The company is organized with a capital of \$1,000,000, and among the directors are such men as Johnathan Edwards, president of the Equitable Trust Company; J. Pierpont Morgan, John E. Alexandre, of the New York and Havana mail line, and others equally well known. The gentlemen concerned have calculated the amount of revenues with results which, in their estimation, afford an assurance of complete success.

H. D. SMITH & CO.,

Plantville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

SARANAC HORSE NAIL CO.

Polished or Blued Horse Nails, Hammered and Finished.

The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer.

J. W. LYNDE, Secretary.

PLATTSBURG, N. Y.

ELY & WILLIAMS, Agents, 1232 Market Street, Philadelphia; 114 John Street, New York; 36 Oliver Street, Boston.

AGENTS FOR

W. & C. Scott & Son's,

J. P. Clabrough & Bros.'

C. G. Bonehill's

BREECH LOADING GUNS.



COLT'S

PARKER'S and

REMINGTON'S

BREECH LOADING GUNS.

HARTLEY & GRAHAM,

Post Office Box 1760.

NEW YORK.

17 and 19 Maiden Lane.

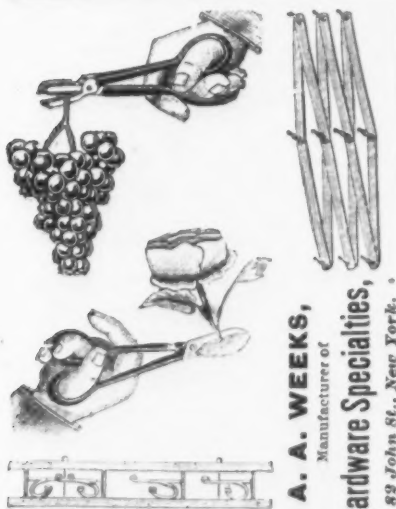
Importers and Jobbers,
AMERICAN BREECH LOADING
ENGLISH " "
BELGIAN " "

GUNS

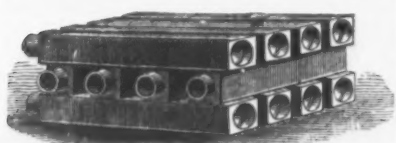
CHEAPEST AND BEST GRADES.
ENGLISH MUZZLE LOADING
BELGIAN " "
FLOBERT RIFLES, Plain and Remington System.

BRITISH BULL DOG REVOLVERS, 38, 44 and 45 Calibre.

Agents for COLT'S and ROBIN HOOD line of REVOLVERS, BRIDGEPORT GUN IMPLEMENT CO.'S GOODS, UNION METALLIC CARTRIDGE CO.



A. A. WEEKS,
Manufacturer of
Hardware Specialties,
89 John St., New York.

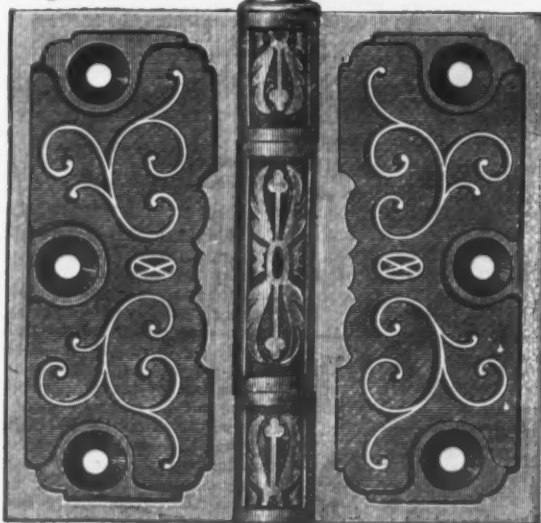


A. WYCKOFF,
Manufacturer of
Wyckoff Patent Wood Water Pipe,
Steam Pipe Casing,
Chain Pump Tube, Curbs, Reels, Rubber
Valves, Chains, &c.
Established 1845. Send for pamphlet.
ELMIRA, N. Y.

THE CLARK MFG. CO.,

Successors to
MANUFAC

CLARK & CO.,
TURERS OF

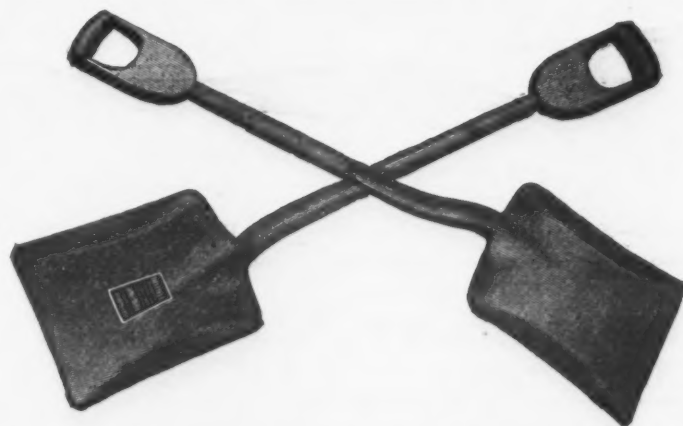


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AND PRICE LIST.

BUILDERS' HARDWARE,
BUFFALO, NEW YORK.

HUSSEY, BINNS & CO.,



PITTSBURGH.

SHOVELS,
SPADES and
SCOOPS.

PROVIDENCE TOOL CO.

Providence, New York, Boston, Chicago.



Wrist & Ankle Shackles.

REVERSIBLE

ICE AND FLOOR SCRAPERS,

MADE BY

PROVIDENCE TOOL CO.,

Providence, R. I.

The advantage of this scraper is that each cutting edge can be changed as fast as worn, and present a new and sharp-cutting edge. Thus the scraper can be used all day and the whole blade made available. It is especially useful in cleaning ice from sidewalks. Price, \$5 per doz.



N. Y. Mallet and Handle Works

Manufacturers of
Calkers', Carpenters', Stone Cutters',
Tin, Copper and Boiler Makers'
MALLETS,

Hawking Beets, Hawking and Calking Irons;
also all kinds of Handles, Sledge, Chisel and Hammer
Handles. Also

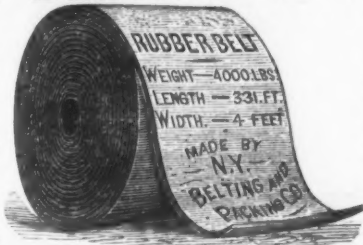
COTTON AND BALE HOOKS,
Patented Feb. 12, 1877; a new combination of Hooks,
456 E. Houston St., New York City.

**THE FAR-FAMED
AMERICAN
LUBRICATOR.**
AMERICAN LUBRICATOR CO.
DETROIT, MICH., U.S.A.

Vulcanized Rubber Fabrics

ADAPTED TO
MECHANICAL PURPOSES.
RUBBER BELTING and PACKING.

Machine Belting,
Steam Packing,
Leading Hose,
Suction Hose,
Grain Elevator
Belting,
Steam Hose,
Piston-Rod
Packing,
Gaskets and Rings.



Vacuum Pump
Valves,
Ball Valves,
Car Springs,
Wagon Springs,
Gas Tubing,
Machine Belting,
Wringer Rolls,
Billiard Cushions,
Grain Drill Tubes,
Emery Wheels.

This company manufactured the immense DRIVING and ELEVATOR BELTS for the Buckingham Elevators at Chicago, which have been running perfectly for more than twelve years, also those for Armour, Lyle & Co., Chicago, and Vanderbilt's great elevators of the New York Central and Hudson R. R., New York, being the largest belts in the world. We are now making an Elevator Belt, 36 inches wide and 200 feet in length, which will weigh over 18,000 pounds.

LINEN and COTTON HOSE.



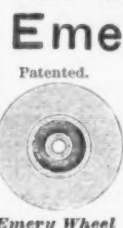
Plain and Rubber Lined.

Circular Woven-Seamless Antiseptic RUBBER
LINED "CABLE" HOSE and "TEST"
HOSE, Vulcanized Para Rubber and Carbolized Duck,
for the use of Steam and Hand Fire Engines, Force
Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.



"TEST" HOSE.

"CABLE" ANTISEPTIC.



Emery Wheel

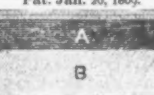
Emery Wheels and Packing.
ORIGINAL
**Solid Vulcanite
EMERY WHEELS**
LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.

The properties of these Wheels are such that they can be used with great advantage and economy for cutting, grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble, Glass, etc. These Wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools, Hoes, Saws, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small Machinery of almost every description.

Pat. Jan. 26, 1869.

PATENT ELASTIC

Pat. Jan. 26, 1869.



Rubber Back Square Packing

BEST IN THE WORLD.

For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps.

B represents that part of the packing which, when in use, is in contact with the Piston rod.
A the elastic back which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.

This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

Corrugated Rubber Mats and Matting,

Pat. 11,268, 213,601.

Pat. July, 1879.

For Halls, Flooring, Stone and
Iron Stairways, &c.

This practical and indispensable article—especially for wear where exposed to ice, snow, or slush—was first introduced by this company several years ago, and its real value is in being almost indestructible, when proper materials are used in its manufacture, whilst the cheap, inferior quality forced on the public by reckless imitators of our patent goods soon becomes brittle and crumbles to pieces. Address

NEW YORK BELTING & PACKING CO.,
Warehouse, 37 and 38 Park Row, New York.

JOHN H. CHEEVER, Treasurer.



CHALFANT MFG. CO.,

Office and Warehouse,

435 Arch St., Philadelphia.

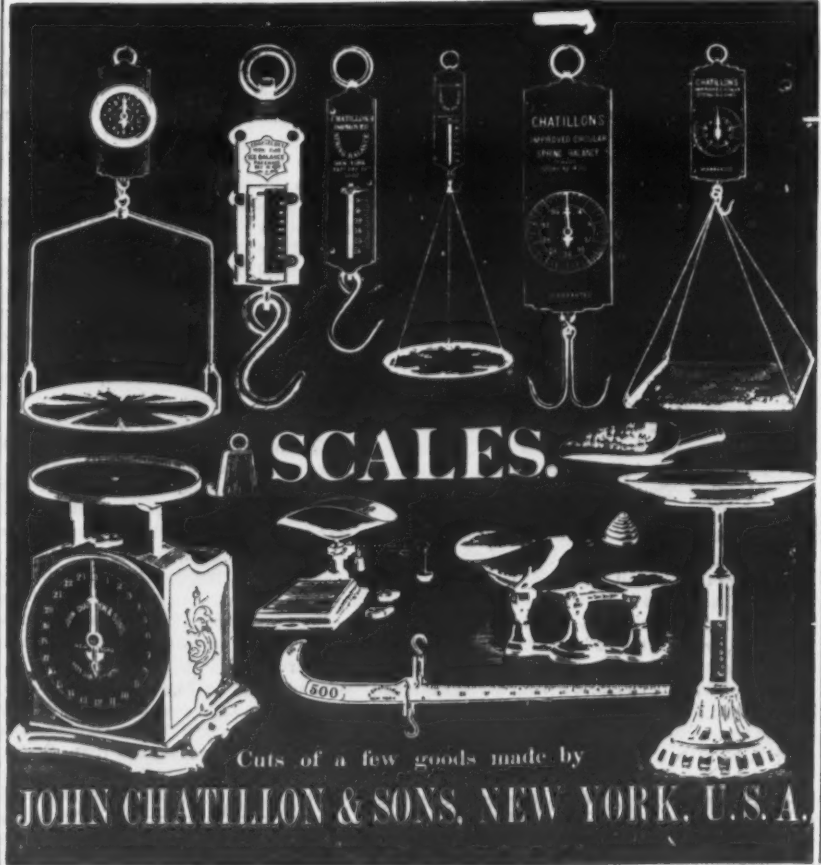
Owners and Manufacturers of the

Celebrated Patent Gas Heating Smoothing Iron.

Can be heated on any ordinary gas burner in three minutes. People who have to board cannot get along without them.
Also manufacturers of the

Improved Troy Polishing Iron

for laundry purposes. For sale by Hardware and Housefurnishing dealers.
Liberal discount to the trade.



SCALES.

Cuts of a few goods made by

JOHN CHATILLON & SONS, NEW YORK, U.S.A.

the 27th ult., manager Edward E. Cook in charge. Only two months and ten days were required to repair the furnaces, which went out on the 17th of January. The career of this furnace has been checked, it having been out of blast five times.

Shenango Furnace No. 2, at West Middlesex, is undergoing repairs. It will be ready for blast about the middle of this month, when it will probably blow in.

The Erie City Boiler Works are reported to be doing a large business, having turned out 800 boilers last year.

The repairs to the Minersville Furnace are nearly finished, and it will go into blast shortly.

Some extensive improvements are contemplated at the National Tube Works Company's mill at McKeesport.

Logan & Strobbridge have broken ground at New Brighton for their new foundry and machine shop.

The nail mill of the Lawrence Iron Company, Limited, at New Castle, so long idle, will soon be put in operation.

There is a report that the extensive iron works at Wheatland, Mercer County, have passed into the hands of a company of Eastern capitalists, and that they will soon be put into active operation.

At a meeting of the stockholders of the Montour Iron and Steel Company, held at their office in Philadelphia, March 30, the following gentlemen were elected to serve for the ensuing year: President, W. E. C. Cox; Directors, W. E. C. Cox, J. N. Hutchinson, S. P. Wolverson, J. T. Humphrey, Daniel Edwards; Treasurer, S. W. Ingersoll.

The furnace at Emaus is being repaired. It is stated that it will require the greater part of two months to get the furnace ready for blast.

The repairs upon No. 2 blast furnace of the E. & G. Brooke Iron Company are progressing rapidly. The furnace will probably be ready to blow in in about three weeks, and will make the third anthracite stack operated by the above corporation.

The Philadelphia Ledger states that the famous Southwark foundry, which covers the block at Fourth street and Washington avenue, formerly known as "Merrick's Foundry," has been sold by its present owners, Merrick & Sons, to a company of capitalists. These have acquired the patents of the Porter-Allen high speed engine, which promises, from experience at some of the largest rolling mills in the State, such as the Cambria Iron Company, of Johnstown, and the National Tube Works at McKeesport, to be one of the engines of the future. The new concern, it is understood, starts with a large number of orders on hand, which are expected soon to tax to the fullest extent the capacity of the works, large as it is.

PITTSBURGH AND VICINITY.

The McKeesport gas well is down 1265 or 1270 feet. The hole is still full of salt water, and the drill is in hard rock. Owing to the latter fact and the water in the hole, the progress is slow, although the work is kept going 24 hours every day.

Morrison & Co., engine builders and machinists, Monongahela City, are engaged at present on a contract for Messrs. Wolfe, Howard & Co., glass manufacturers, of Pittsburgh. The contract is for the iron work complete for one of Chance's flattening ovens. Messrs. Morrison & Co. also build oil and hoisting engines of a new design, furnish supplies for coal roads and coal tipples, and do a general business. The resources of their foundry and shops are fully employed.

The Isabella Blast Furnace Company are making some improvements about the works. Four new boilers, each 30 feet in length, are set up in the place of the old ones, which are each 64 feet long, and two new hot-blast furnaces are to be erected, at a cost of about \$9000.

The Vesuvius Iron Works, at Sharpsburg, have at no time in eight years run as steadily as at the present time. The stock in the metal yards has never been so large. Messrs. Graff, Bennett & Co. have made some improvements at their iron works at Millvale. A large blacksmith shop has been erected, and the works are doing double turn in all departments.

The boiler works near the Sharpsburg Bridge, formerly operated by Bollman, Kilgore & Co., but which have been idle for nearly three years, have been purchased by a new firm. The works will resume operations in a short time. Men are being employed to make the necessary repairs.

The following are some figures regarding the March run of the Edgar Thomson "A" Furnace: Total product pig metal for month, 2763 1420-2240 tons; coke used, 2843 980-2240 tons; average amount of coke to 1 ton of pig, 2305 pounds; limestone used, 2148 1680-2240 tons; average amount of stone to 1 ton of pig, 1750 pounds. Ores used, Tafna, McComber, Pilot Knob, Purple, Bona and Greenway; total amount used, 5074 1431-2240 tons; percentage of pig obtained, 54 46-100 per cent. The "B" Furnace, 20 x 80 feet, blew in for the first time April 2, and made the first cast on the evening of the 4th, consisting of 25 tons.

VIRGINIA.

The Philadelphia and Reading Iron and Coal Co. have bought at auction the Powhatan Furnace, near Richmond. They held a mortgage of \$75,000 on the property and bought it for their debt. They expect to go in blast within two months.

The preparations now being made along the line of the Chesapeake and Ohio Railroad indicate great activity in this portion of Virginia. An additional furnace is being erected at Longdale; a very large one at Lowmoor, together with 100 coke ovens; Buffalo Gap Furnace, 15 miles west of Staunton; and at Ferroll the old charcoal furnace is rapidly undergoing a change to adapt it to the use of coke, and the erection of a new furnace of large capacity is contemplated at that place. It is stated, moreover, that Eastline Furnace will in all probability resume operations, and that Mt. Torry, 15 miles east of Staunton, will be started up.

A portion of the Buffalo Gap Iron and Steel Works was burned on the 30th ult. The loss is estimated at \$20,000.

WEST VIRGINIA.

The four new boiling furnaces at the Benwood Mill, Wheeling, are nearly completed.

The new hot blast at the Belmont Mill has been completed.

KENTUCKY.

Work on the rebuilding of the Pennsylvania Furnace is advancing rapidly enough to enable the resumption of active operation in the early part of May. The engine-house is up, and the engine, blowing tubes and machinery are in their places. The bridge-house has also been completed and the boilers are swung up. Two hundred loads of charcoal are on hand, and new coal is expected to come in this week. This year's blast is based on 10,000 cords of wood. Iron ore, for which \$3 is paid per ton, is coming in satisfactorily, and 4000 tons of it are now on hand on the stock bank.

The Ashland Furnace is working well, making an average of about 46 tons of No. 1 iron per day, using only raw coal for fuel.

OHIO.

The erection of a large steel mill just outside of Youngstown is contemplated at no distant day.

The Cleveland Crucible Steel Company has organized by the election of J. H. Clark, C. P. Leland, E. M. Grant, S. C. Prentiss, L. Prentiss, R. B. Smith, and C. M. Voice, directors; Mr. Clark being president, and E. M. Grant secretary and treasurer. This company will manufacture the finer grades of tool and machinery steel, and for this purpose have secured the services of Mr. R. B. Smith. A new building has already been erected on the Cleveland and Pittsburgh Railroad, near Garden street, where the works are located, and it is expected that they will be in running order within a few weeks.

The Youngstown Rolling Mill Company will soon have their new puddling furnaces completed. All departments in their mill are running double turn.

It is said that the machine and repair shops of the Hocking Valley and Gallipolis Railroads are to be established at Logan.

All of Brown, Bonnell & Co.'s works at Youngstown are running double turn. A new ore crusher and a plate straightener have been received. The addition to their foundry is completed.

At Shawnee the XX Furnace is in operation and making good iron. The Vilas Furnace is blowing, but it is said there are prospects of its going out for repairs.

The Etna Charcoal Furnace will go in blast on the 20th.

One of the large 86 x 18 furnaces of the Etna Iron Co., at Ironton, blew out on the 27th ult. The stack is about cleaned out, and she will not blow in again until about the first of May.

Work has been much advanced at the N. Y. & O. Works during the past week.

A communication from Furnaceville, dated March 29, says: Work continues progressing favorably at the works of the Glasgow and Port Washington furnaces and mines. They have ceased using anthracite coal, claiming it has proved a failure. No. 2 stack is doing well, and No. 1 will be put in blast in the course of two weeks. The company have orders for 600 tons of iron, and are shipping from three to five car loads of iron daily.

ILLINOIS.

The capacity of the North Chicago Rolling Mills is reported to be 280,000 tons per year, viz.: Fish plates, 20,000 tons; merchant bar, 40,000 tons; pig metal, 80,000 tons; iron rails, 60,000 tons.

The plant formerly owned and worked by the Chicago Steel Casting Company has been purchased by a Mr. Mason, who, we are informed, will operate it as an iron foundry hereafter.

MISSOURI.

A telegram from Joplin, dated the 4th inst., reports that the Joplin Foundry was totally destroyed by fire on the 3d. The fire originated in Moffatt's White Lead Works, which were also burned to the ground.

MICHIGAN.

The new charcoal furnace of the Spring Lake Iron Company, at Fruitport, referred to in our last issue, made, in its second full week's work, 331 gross tons of pig, or 47.31 tons per day. Major Pickands promises to turn out 400 tons as soon as the furnace gets fairly settled down to her work.

The fires are to be lighted in one of the Deer Lake furnaces this week, if nothing prevents.

An Elevated Electric Railway for Berlin.—The council of magistrates of the city of Berlin had under consideration, a few days ago, a proposal, submitted by Messrs. Siemens and Halske, for the construction of an electric railway across a portion of the capital. There will be two lines of rails, one for the up and the other for the down journey. The lines will be carried on iron pillars 14 feet 9 inches high, and nearly 33 feet apart. The pillars will be placed along the edge of the footpath, so as to cause the least possible interference with the ordinary traffic. The carriages will be narrow and short, containing ten sitting places and four standing places. The electro-dynamic machine, which will propel the carriages, will be placed under the floor of the carriage between the wheels, and a steam engine of 60-horse power, which will be employed in the production of the electricity, will be placed at the terminus. The stoppages will be very few, and the rate of speed will be, it is expected, about 20 miles an hour. The chief object of the undertaking is to convey persons quickly across the city, and especially to facilitate access to the city line of railway. The chief objection raised is that the carriages will pass along at the level of the first floor of the houses in the streets which it will traverse, and it is feared this will lead to a depreciation of property. The magistrates have appointed a special commission of engineers and architects to examine into and report upon the proposal.

The gross amount of ore mined in Essex County, N. Y., last year was stated in a recent issue of *The Iron Age* to have been 240,341 tons. This was an error. The amount should have been stated at 420,341 tons.

The Iron Age

AND
Metallurgical Review.

New York, Thursday, April 8, 1880.

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Thirty-seventh Page.—Boston Hardware and Metal Prices.

A correspondent in the retail hardware line writes us a complaint of the present system of packing hardware, and asks us to urge upon manufacturers the wisdom of abandoning the gross, half gross and quarter gross and dozen method, and adopting instead packages of ten, twenty, twenty-five, fifty and one hundred. The reason urged in support of this suggestion is that it would suit our currency better and save the retail dealer considerable time on every invoice. We are not sure that the suggestion is a good one, but if it were, such is the conservatism of trade that it is not likely to be adopted by manufacturers. The plea that it would facilitate the convenience of the retail dealer is not so strong as it would be if goods were sold by a net list. He has to figure out the cost of his goods in any case, and it would not, in any conspicuous degree, promote his convenience to have the change made. It would, on the other hand, necessitate the publication of new catalogues and a general revision of list prices, which would

be a rather serious matter to many of the houses. All things considered, we doubt if the retail trade would favor the proposed change. Business methods have conformed themselves to the existing system of packing in dozens and multiples of 12, and while this may not be the best possible system, it is easier and cheaper to continue it than to change it.

The Commercial Influence of Great National Armaments.

The London *Economist* has lately published some statistics of European armaments which are well calculated to startle the thoughtful reader and make the taxpayer shudder at the outlook before him. It appears that the present taxation of Europe, estimated on a basis of 4 per cent. interest, represents a capital of £3,200,000,000 which is lost to the arts and industries that promote the progress of civilization and improve the condition of the people. The effect of this enormous burden cannot but be felt in a notable degree in the distribution of the world's commerce. On this point the *Economist* says:

It is becoming more clear, day by day, that the industrial competition of the future will be between North America and Europe. North America, possessing all climates, produces, or can produce, everything, and has fairly embarked on an industrial career, and will without doubt ultimately relieve herself from the shackles of protection. The United States are rapidly paying off their debt, the only serious national debt of the continent, and it is possible, if not probable, that the republic and Canada may hereafter be bound together by some more or less strict engagement of customs union. Should that occur, it is extremely probable that by 1900, only twenty years hence, North America may compete with Europe in all the markets of the world for the sale of produce and manufactures, which will have had to provide in America only \$20,000,000, against the European \$25,000,000 for State expenses; in other words, that Europe may be faced by a competitor equal to her in all resources except number of hands, and paying not more than one-tenth of her total taxation. That is, of course, putting the matter favorably for America, for we suppose the United States' debt paid off; but it is not putting it too favorably, for we have omitted the heaviest item in the calculation. Europe, besides paying ten times the total sum in taxes, will have no heavy young men between 19 and 22 engaged in industrial production. They will all be in the army, as outside these islands they already are. As the period of energetic labor with all men only lasts about thirty years, Europe, besides her immense taxation, will be sacrificing, in comparison with America, one clear tenth of her available supply of human force. We do not wish in the least to exaggerate the total result, for we are well aware that all economists have underrated the capacity of mankind to endure taxation, and have forgotten too much that oppression is sometimes a stimulus; but we have no hesitation in saying that, as between one continent and the other, the older one will enter into the ultimate struggle loaded with a State demand, to be satisfied before profit is realized, equal in weight to a universal income tax of quite three shillings in the pound. That is a heavy load to stagger under, and there is every sign as yet that it will be steadily increased, for the military experts are ruling, and it is evident from the speech of the ablest among them (Von Moltke) that they do not seriously care about the increase of the financial burden.

Every year makes more apparent the wisdom of the advice of Washington—"Avoid entangling foreign alliances." No doubt the evil of great armaments will work out its own cure, as all such evils do in time, but it is a problem with which the statesmanship of the present seems incapable of dealing. Fortunately, the future of this country is not wholly dependent upon the decadence of Europe; but as the old world becomes exhausted through the operation of causes which are sapping the energies of the nations, our wisest policy will yield a larger and more general prosperity. For us, the question of the maintenance of great military preparations has this much of interest, at least. Of course the *Economist* makes our realization of the benefits which would naturally result to us from the unfortunate condition of Europe dependent upon our adoption of the principle of free trade. This is where it makes a great mistake. Given universal free trade and England would grow rich with a burden of taxation which would now be national bankruptcy. Give her all the foreign markets she wants and it would surprise the statisticians how much she could well afford to spend annually for her army and navy and for foreign wars. Without this she cannot prosper, and as her commerce declines her power will decline with it. Universal free trade is impossible; and the country which is entrapped into such relations with England will have occasion to realize that the British nation possesses a wonderful degree of vitality. If we are to compete with all the world in twenty years, it would not be well to begin by abandoning a policy which more than anything else has developed and diversified our industries and made us already formidable as competitors of Europe. It is too soon, at least, to give up the substantial benefits of protection for the spurious of pot luck which is promised as the result of free trade.

Secretary Sherman has the reputation of being an able, far-sighted man; but his weak, vacillating course on the hoop iron question shows that his cunning has deserted him, in one instance, at least. The object of the Secretary is too transparent to deceive anybody except himself, and by his action he defeats the very end in view. The Presidential "bee" in the bonnet of the ablest statesmen makes fools of them at times, and Secretary Sherman will find that his bluster and threat of what he would do if Congress did not take action on the hoop iron subject by April 1, and his weak breakdown, will gain him neither friends nor fame. The circumstances have not changed.

No new arguments are advanced why he should or should not take the action he decided he would take. The simple reason is, he dare not. He tried to shift the responsibility on Congress, but that body refused it, and now he dare not carry out his threat.

The Panama Canal Project.

M. de Lesseps has finished his travels on the American continent and started on his return to Europe. We do not, of course, know what impressions he has derived from his visit to this country, but we venture the opinion that he has learned more and accomplished less than he expected when he came here. The result of the recent English elections will no doubt cause him to change his plans materially—if, indeed, he had not already decided to do so before the returns reached here. Under Mr. Gladstone's premiership the policy of the English government will be decidedly favorable to fair and friendly relations with the United States on all questions of international interest. If, as is currently reported, M. de Lesseps had such an understanding with Lord Beaconsfield as made him feel quite indifferent to the protests and demands of the United States, the formation of a new cabinet under liberal leadership will cause him to look at the matter from a very different standpoint. He can expect no countenance from Mr. Gladstone's cabinet in any course which does not recognize the weight of any just conditions that this country may impose upon those who are engaged in furthering the scheme of an inter-oceanic canal. Without such countenance as Lord Beaconsfield is supposed to have given his scheme, M. de Lesseps would never have manifested the indifference he felt, or assumed, with regard to the views and utterances of Congress on this important subject.

In this view of the case we can understand to some extent what has been generally regarded as a great mistake on the part of M. de Lesseps. Doubtless he thought he could well afford to shrug his shoulders and smile apologetically at the popular discussion of the Monroe doctrine which his visit has raised. But it is quite evident that he has overrated the strength of his position and underrated the meaning of the popular feeling in this country. Throughout he has treated this country with a degree of courteous disrespect which has not been misunderstood or mistaken. The American commissioners, who at the eleventh hour were invited to take part in the deliberations of his so-called scientific commission, had really nothing to do with its work, and are consequently but little responsible, if at all, for the valueless character of the results reached by it. Thus, without openly insulting the United States, he has practically ignored it from the first; and nothing which he said or did while here has changed the unfavorable impression his course has created. It is not probable that he is ignorant of this, or that he takes home with him any seriously mistaken impressions on this point. If he has read the newspapers, he has had no difficulty in correctly interpreting the meaning of the personal attentions our people were pleased to show him during his visit. He must have seen that if the success of his scheme is in any degree dependent upon the approval of this government and the subscriptions of our moneyed classes, it is already a failure. His polite offer of \$60,000,000 of stock to American investors is likely to be "respectfully declined, with thanks." There is no probability that such an amount will seek investment in an enterprise which the American stockholders are not likely to control, and which does not promise financial success, even on the basis of M. de Lesseps' estimates. Whether the enterprise is practicable or not is still an open question, and one on which there is room for differences of opinion. Our business men generally are not impressed with the prospects of the scheme as an investment, especially in view of the attitude which our government has assumed toward it; and our people are not likely to be bewildered by the brilliancy of the engineering work proposed, or led into paying for it until it gives greater promise than now of meeting an actual, practical, pressing requirement of commerce. By his visit to this country, M. de Lesseps has done nothing to change this feeling. All that he can take away with him is a pleasant impression of American hospitality, and the conviction that the American people are not easily influenced against their judgment.

There is a report abroad in the West to the effect that the Amalgamated Association of Iron and Steel Workers will refuse to work foreign pig and scrap iron, including old rails. There is no doubt that the advisability of taking some such course has been discussed in the lodges of the association, and at the last meeting of the Grand Lodge the old rail side of the question was ventilated—at least some of the questions that arise in mills where old rails have been used, were discussed. In the use of scrap, at least half of the work of boiling is done away with. The price paid for scrapping in a boiling furnace, or "bushelling," as it is termed, is one-half the price for boiling. The output, however, is largely increased, and a puddler can make as much per day scrapping as puddling, if not more, and so far as the objection to the use of foreign scrap is concerned, this increased output is doubtless the great difficulty. It seems to be the

policy of the association to restrict production. There is, perhaps, not a rolling mill in the country, certainly not many, that would be allowed to work up to its full capacity. The use of this foreign scrap that is arriving in such quantities is largely increasing the output of these mills in the way pointed out, and the puddlers are growing restive under the loss of work that results. Just at this time the demand for iron is so great that the puddlers are kept busy, but when the demand falls off and the tendency is to use scrap to as great an extent as possible, this feeling will become stronger and definite action will then be taken, if not before.

The Position of Copper.

The position of copper is becoming one of unusual interest on both sides of the Atlantic. The visible supply in England and France at latest dates was the following:

| Stocks of copper. | 1880. | |
|---|---------|---------|
| | Mar. 1. | Feb. 1. |
| Stocks in Europe: | Tons. | Tons. |
| Chili ores and regulus, Liverpool and Swansea (equal to fine)..... | 270 | 270 |
| Chili bars in Liverpool..... | 25,317 | 25,928 |
| Chili bars in Swansea..... | 4,316 | 4,358 |
| Chili ingots in Liverpool..... | 50 | 50 |
| Foreign copper (chiefly Australian) in London..... | 4,525 | 4,589 |
| Foreign copper (chiefly Australian) in London, landing..... | 300 | 270 |
| English copper in London..... | 50 | 50 |
| Chili bars and ingots and barilla in Havre (estimated)..... | 3,038 | 2,517 |
| Other copper in Havre..... | 150 | 170 |
| Stocks of copper contained in other foreign ore and Spanish precipitate (fine)..... | 731 | 533 |
| Afloat and chartered from Chili to Europe (advised by mail): | | |
| Ore and regulus (equal to fine)..... | 2,374 | 3,053 |
| Bars and ingots..... | 9,879 | 10,905 |
| By cable: Ore and regulus (fine)..... | 1,250 | 850 |
| Bars and ingots..... | 6,150 | 2,050 |
| Afloat from Australia (advised by mail): | | |
| Fine copper..... | 1,625 | 1,381 |
| By cable: Fine copper..... | 1,925 | 2,800 |
| Total..... | 61,944 | 59,644 |

Instead of improving, the statistical position has therefore been getting worse, due principally to the heavy charters on the West Coast, stimulated by a favorable exchange and low freights. It had been expected that the war on that coast would have curtailed copper production, for it was believed that many miners would be enrolled in the Chilean army; but this, it seems, has not been the case. Chili, therefore, exports about as much copper as ever, as the ensuing table will show:

| EXPORT OF COPPER FROM CHILI. | |
|------------------------------|---------|
| Tons. | Tons. |
| 1850..... | 36,289 |
| 1861..... | 36,371 |
| 1862..... | 43,169 |
| 1863..... | 39,545 |
| 1864..... | 47,500 |
| 1865..... | 45,097 |
| 1866..... | 44,800 |
| 1867..... | 46,554 |
| 1868..... | 45,659 |
| 1869..... | 54,867 |
| Total..... | 438,851 |

The great decrease of production has been in England.

| PRODUCTION FROM BRITISH ORES. | |
|-------------------------------|---------|
| Tons. | Tons. |
| 1860..... | 15,968 |
| 1861..... | 15,311 |
| 1862..... | 14,843 |
| 1863..... | 14,747 |
| 1864..... | 13,300 |
| 1865..... | 11,888 |
| 1866..... | 11,875 |
| 1867..... | 10,123 |
| 1868..... | 10,213 |
| 1869..... | 9,817 |
| 1870..... | 8,921 |
| Total..... | 125,073 |

While Chili has kept steady during the twenty years, England has fallen from 125,073 tons in 1860-69 to 50,833 in 1870-79. Since then the production of Australia, the Cape, the United States, and Spain has increased sufficiently to keep up a steady supply, notwithstanding the enormous consumption which has been growing up all over the world, especially in the countries whose industry is in a highly developed condition, for in most of the great modern inventions and uses springing therefrom, copper has played and is playing a prominent part. The supply being fully equal to the consumption of late years, despite the increased use that is made of copper, the high prices which ruled during the inflation period preceding the panic of 1873 have not only been sustained, but they have declined to figures in 1878 and 1879 which few people in the metal trade anticipated.

These excessively low prices stimulated consumption to the utmost, without however materially reducing production, except perhaps from British ores. Now that much of the decline has been recovered, the output will no doubt be a liberal one everywhere, and this anticipation of a steady, full supply from all quarters acts as a check upon a further rapid advance, and the market evidently pauses midway between two extremes on both sides of the Atlantic.

In Spain a great impulse was imparted to Copper production in 1879. The export of Copper in bars from there amounted last year to no less than 20,834 tons, against 1377 tons in 1878, and that of Copper ore to 459,576 tons, against 427,259 tons the previous year. Much of the Spanish Copper in bars is shipped to Marseilles, and therefore does not figure in the usual statistics of which we have given a specimen at the head of this article.

The advance in copper has not been as considerable as the one in other metals; it has to a great extent been legitimate, and less the work of speculators than the result of the conviction that the metal had been allowed to decline much lower than there was any sound reason for. Hence actual prices, although 30 per cent. higher than the lowest previous point, are by no means

looked upon as dangerous. The little fluctuation, in spite of great dullness, moreover shows this sufficiently.

In the United States, Copper has been doing remarkably well for the past eight months. The manufacturing branch has been quite active, stimulated by actual demand for consumption, so much so that with a net export last year of only 3,000,000 pounds, we have but a moderate visible supply for the next couple of months. Should the domestic demand be kept up, we may have as little to spare the Europeans out of our this year's production as we had last year. It is too early in the year to venture an opinion upon the continued activity in this particular branch of the metal trade, but the indications thus far are not unfavorable; at all events the present price of copper is no obstacle to a healthy business.

Should there be little Lake copper to spare for export to Europe, it would increase the strength of the position over there, and the developments here are consequently watched from the other side with more than usual interest—the more so, as an excess of 3000 tons charters at Valparaiso in two months has taken them aback considerably. Business matters in Europe do not look as reassuring as they do here, and the knowledge that we continue to get on tolerably well will go a great way this year to prevent them from sliding back into positive stagnation in any one branch—particularly in a branch like the copper trade, in which, next to the English and French markets, ours certainly holds the most important rank nowadays, in consequence of the popularity which our Lake copper enjoys for certain special purposes.

Much will, of course, also depend on future charters on the West Coast and on the production in Andalusia. That Chili will vary much from the average of the past twenty years, which has been 44,464 tons, is hardly to be expected, while an increase of 10,000 tons Andalusian production on top of the enormous excess of 1879 would be something extraordinary indeed, and is by no means likely. Whichever way we may look at the present position of the metal, it appears to us tolerably sound, notwithstanding the lack of animation observable at this moment.

The Nail Market.

The action of the Western Nail Association, at its meeting last week, in continuing the stoppage of the factories for two weeks longer, making a total stoppage of four weeks, evinces a determination on the part of its members to remove the last vestige of doubt from the minds of buyers, of their purpose to control the nail market for this year, at least. The meeting is reported to have been larger than the one held two weeks previous, and the action was taken without a dissenting voice, though the further stoppage would press heavily on certain members. If the statements are to be believed, and there are many circumstances that give indirect evidence to this effect, there are very few mills in the West to-day that can sort up out of their stock 1000 kegs of nails. The mills are refusing orders, or accepting them with the condition that they are to be filled as soon as possible after the mills start. Orders that have already been accepted cannot be filled. A mill with nearly 100 machines is stated to have an order for about 3000 kegs, for which they have been paid, and they cannot fill it. Other mills are similarly situated. These facts indicate light stocks at the mills. On the other hand, reports of careful inquiries show that stocks in the hands of jobbers and speculators are not at all heavy. We have given reasons for this belief before. It is claimed that a careful personal investigation by members of the Nail Association, made in the latter part of February and first of March, showed that at the distributing points west and northwest of a line drawn from Chicago to St. Louis, including both of these cities, as well as Milwaukee, St. Paul and all points on the Mississippi and Missouri rivers, and as far west as Denver, the stock of nails to go into the spring trade was not 300,000 kegs, if it was 250,000. Since that time the stock has decreased very largely, and, what is of especial importance, the speculative stocks have been sold.

This action of the Western Nail Association is no experiment with it. It has been tried before with the best results. In 1866, when the difference between the price of bar iron and nails was greater even than the present difference (nails selling at \$7.50 per keg), the association agreed to a stoppage of four weeks for the purpose of maintaining the price of nails. At the end of this time a further stoppage of six weeks was agreed upon and carried out. The result was that the price was held for a year and the mills made a profit.

It has been claimed that the profit the nail men are striving for is excessive, and that their action should be discountenanced. This is absurd. When nails were selling at \$1.75 per keg, no one suggested that buyers should be tender-hearted and voluntarily raise the price. It will require a good many months' run at the present rates of profit to restore to many mills the losses of the years of low prices, let alone any accumulation for the hard times that must come in the future.

If our English friends were surprised at the reports of the make of our blast furnaces that have been published in the past,

the record of the Lucy Furnace No. 1 for March will overwhelm them with astonishment. When this furnace reached 845 gross tons 1720 lbs. in the week ending March 21, its manager thought surely that must be the maximum, but in the week ending March 28 the furnace made 857 gross tons 530 lbs.; and, what is still more remarkable, in the seven consecutive days ending March 31, the production was 945 tons 1580 lbs., and for the month of March, 3684 tons 500 lbs., an average of 118 tons 1895 lbs. daily. The Lucy still retains its pre-eminence, and bids fair to reach the output that has been predicted for it—1000 tons in seven consecutive days.

A Statement that Should be Substantiated.

It is no uncommon thing when strikes are frequent and continued in any trade or locality, to have the charge made that manufacturers in the same trade and in other localities are aiding and abetting the strikers—not only with sympathy, but with material aid. If a strike occurs in the East, it is asserted that the Western manufacturers aid its continuance, and when the West has its works stopped, a similar charge is made against the East. To the honor of trade and fair business rivalry, it can be said that these assertions rest, in most cases, on no better basis than flying rumor, which it is impossible to trace to any source, much less to any responsible party. They are based usually on suspicions. It is possible that the partners in a co-operative concern, or a stockholder in some establishment who is a workman, may, as a workman, have sent aid and comfort; but even this is often only suspicion, and it is rarely any one with character or reputation for truthfulness can be found to give currency to these statements, much less to father them. A case, however, has just come to our notice in which a responsible person is credited with such statements, and what is worse, the charge is against our friends across the water. Hon. Carroll D. Wright, chief of the Bureau of Labor Statistics of Massachusetts, is reported as saying that "paid agents of English manufacturers are at this moment at work in New England, with the sole purpose of inciting strikes among our operatives."

It hardly seems possible that Mr. Wright would have made such a statement, if he did make it, unless he had good authority for the same, and if he has such authority it is certainly his duty to give it, that methods of rivalry so detestable may meet with the scorn they deserve. Such methods spring from the same spirit that leads the assassin to rush from concealment and stab his rival, whose only crime is that he is his rival. It has not the first element of honorable rivalry, and for the fair name of trade it should meet the severest condemnation.

We regret to say that the enterprise and enthusiasm of the scientific reporters of the daily press have again placed them in a ludicrous and by no means enviable position. It appears that they have betaken themselves to the den of the "wizard of Menlo Park," and have there learnt wonderful things about the working of tailings. Mr. Edison seems to have become suddenly an amateur metallurgist, and while we hope that he may be more successful than scores of inventors who "failed to get a process for the sulphuret," we fear that he will find more than one stumbling block on his way to success. He has, however, permitted himself to be handicapped in the outstart by the ridiculous misrepresentations and statements of the reporters of the daily press, before whom enchanting visions of "millions in it" seem to have risen, and we regret to say that some of our technical journals have repeated and commented in the same spirit on the future of the "Edison Ore Milling Company." "After crushing and triturating" (whatever that may be) auriferous quartz in the ordinary way, and after having thus extracted an average of \$20 to \$40 a ton, Mr. Edison takes the refuse and extracts from it—at a merely nominal cost of \$5—all the way from \$80 to \$750, or even \$1400 a ton. Such figures are sufficient to make any gold mill manager's hair stand on end, and with tailings like these we would soon find hundreds of eager capitalists paying from \$50 to \$700 or even \$1300 a ton for every ton of such refuse. All over our Western mining regions expensive and great mills would rise out of the ground, specially designed for making tailings out of gold ore. The \$20 or \$40 which the ore would first yield before being turned into the more valuable tailings might be given away, in order to realize the well-known miner's dream of "paying the whole national debt." It is to be hoped that this small portion of the proceeds will not be diverted to other uses, or that Mr. Edison, with a false sense of economy, will dispense with the intermediate process of producing high grade tailings and apply his process to the ore directly.

Production of Iron and Steel in France in 1879.—The French Ironmasters' Association publishes, in the *Bulletin du Comité des Forges*, the following statistics relating to the production of iron and steel in France during the year 1879: The blast furnaces of that country turned out 1,344,759 metric tons of pig iron—a falling off, as compared with the preceding year, of 72,314 tons. There is an increase, however, in the quantity of rolled iron manufactured, the figures being 768,335 and 838,706 tons

respectively. The production of iron rails declined from 125,000 tons in 1878 to 43,000 tons in 1879. Merchant iron and bars figure in the above for 668,226 tons. About 339,000 tons of steel of all kinds were made—an increase of 57,600 tons, when compared with the previous year. This increase is due mainly to the Bessemer and open-hearth works, which turned out in 1879, 314,691 tons, other kinds of steel exhibiting a decline to 24,718 tons. French railways bought their whole supply of rails from home manufacturers, the amounts being 202,435 tons of steel rails and 27,604 tons of iron rails.

NEW PUBLICATIONS.

STEEL: ITS HISTORY, MANUFACTURE, PROPERTIES AND USES. By J. S. Jeans, secretary of the Iron and Steel Institute. E. & F. N. Spon, publishers. Price \$14.50.

One of the most important metallurgical works written within the last few years is that published by Messrs. E. & F. N. Spon. The volume is so bulky, covering more than 850 pages, that we must limit ourselves for the present to a simple statement of its contents, without entering into any inquiry as to the methods used in presenting so important a subject, or the accuracy of Mr. Jeans' information or judgment. This we must reserve for a future occasion. We are, however, enabled, from a cursory examination of the book, to strongly recommend it to those who desire to possess in a convenient shape a full summary of the literature of the subject up to date. The work is divided into 29 chapters, No. 1 giving a sketch of the early History of Steel; No. 2, its Modern History and Development in Great Britain; No. 3, the Progress of Invention; No. 4, History of the Bessemer Process; No. 5, the Siemens and Siemens-Martin Processes; No. 6, other Processes for the Manufacture of Steel, including Martin's, Parry's, Uchatius', Attwood's, Heaton's, Robert Mushet's, Sherman's, Larkin's, Henderson's, Gallet's, Peters', Spence's, Shielfield's, Lane's, the Styrian, the Carinthian, the Pal Works, Terrenoire, Whitworth, the Neuberg. Chapters 7 to 13 inclusive, which close the first section of the book, treat of the process of manufacture, the statistics, resources, &c., of America, Germany, Austria, Russia, Sweden and other countries. The second division comprises chapters 14 to 17, giving details of the cementation, the Bessemer, the Siemens-Martin and other methods, while the third section, treating of the chemical and physical properties of steel, embraces: Chapter 18, Phosphorus in Steel; 19, the use of Manganese; 20, Silicon; 21, Sulphur in Steel; 22, Silicon in Steel; 23, Tensile Strength of Steel; 24, Mechanical Tests of Steel; 25, Analysis of Steel. The fourth section deals with the uses of steel as applied to railway purposes, shipbuilding, bridge building, guns and armor, &c.

INDUSTRIAL MONTHLY AND COMMERCIAL AND STATISTICAL REVIEW. New York: E. Young & Co., Publishers.

We are sorry that this latest candidate for public favor in the field of newspaper enterprise has not a more specific object in view than its plan would seem to indicate. Dr. Young has had an extensive experience in this class of work. His long and honorable connection with the Treasury Department, as Chief of the National Bureau of Statistics, has given him unusual facilities for successful work in statistical journalism, which, however, would be more profitably employed if the *Industrial Monthly* should devote itself to some specific class of statistics, and work them up into the greatest possible fullness and accuracy. It would seem to us that the department of textiles and textile fibers is an inviting one. A journal making a specialty of full and complete statistics of everything pertaining to cotton, wool, silk, flax, &c., and the manufacture and movement of all fabrics into which they enter, would be of value to a very large class of manufacturers and merchants, while one of more general and less specific statistical interest is less likely to be appreciated. We wish the new venture every success; but business men now-a-days have very little time to spare for the acquisition of general information, and for this reason those trade journals are most successful which give one class just what they want to know, and very little else.

RAILWAY MAP OF THE UNITED STATES. Published by the National Railway Publication Company, New York.

For easy and frequent reference, a good map of the railways of this country will be fully appreciated in every office. That just published by the National Company will, we believe, from a close examination, be found to meet the requirements of most of the readers of *The Iron Age*. It is of suitable size for offices, and is clearly and well printed on strong paper.

The export movement is receiving a new impetus, vessels now leaving American ports taking out much better cargoes, notably of grain and shipping interests are in a more healthful condition. But it is noticed that the great bulk of outward freights consists of domestic produce. Only here and there in the list do we find such items as machinery, implements, hardware, &c., and the aggregate of these goes only a little way toward making up the grand total of more than seven and a quarter millions for March. Upon inquiry, we learn that our merchants do not observe any improvement whatever in the export of general manufactures, excepting as a demand exists abroad for certain articles or special lines which cannot be obtained in other markets. As for the manufacturers, they appear, as a whole, to be supremely indifferent to the foreign trade, being full and overflowing with domestic orders paying a full profit. The check received from advancing prices is yet in full force, and so long as the American market continues relatively higher than others for staple goods, just so long will business be confined to "sorting up" and special orders on a restricted scale.

METALLURGICAL NOTES.

MALLEABLE NICKEL AND COBALT.

At a recent meeting of the Mining Club, at Freiberg, Saxony, Prof. Winkler exhibited samples of malleable nickel and cobalt, produced by the Pfannenstiel Works, where experiments have been made in that direction since 1866. It was found that the most careful decarbonization of cast nickel and cobalt, attained by melting them with their oxides, did not lead to the result required, the product showing a strong inclination to crystallization, and breaking to pieces in the rolls or under the hammer. Prof. Winkler suggests that possibly this is owing to the fact that decarbonization was carried too far. In 1877 Herr Edelmann succeeded in rolling thin nickel sheet and wire, but it was not possible to detect the conditions assuring regular success. Fleitmann's process of adding magnesium was then tried, but proved a failure at Pfannenstiel. Soon afterward, however, Herr Bischoff found that cobalt of great ductility and toughness could be obtained regularly by subjecting the metal to a carefully conducted refining process. The same method afforded satisfactory results with nickel also, the metal forging and welding well.

THE KRUPP WASHING PROCESS FOR PUDDLING.

Some details are given by Herr C. Petersen, of Eschweiler, Germany, on the working in the puddling furnace of pig purified in the Krupp washer, which as they supplement the data given by Mr. Holley (*The Iron Age*, Oct. 9, 1879) will be read with interest. At Essen, where the runs given below were made on the 12th and 13th of August, 1879, the Krupp washer is too far from the puddling plant to admit of the metal being run directly into it after treatment. It is cast, therefore, and then remelted in a cupola, from which it is tapped into the Bicheroux puddling furnaces. With a plant specially erected, this remelting would, of course, be unnecessary. The following is a copy of the record of the working of 18 charges, the pig of No. 1 to 6 inclusive, being a mixture of 80 per cent. of Metz & Co. and 20 per cent. of Kupferdreh pig; Nos. 7, 8, 9, 13, 14 and 15 Metz & Co. pig alone; Nos. 10, 11 and 12 Schlesien, and Nos. 16, 17 and 18 Biede pig. The first 12 charges were made on the 12th, the last 6 on the 13th of August.

| No. | Time, h. m. | Weight of pig, cwt. | Weight of scrap, cwt. | Weight of coke, cwt. | Weight of gas, cwt. | Weight of iron, cwt. | Weight of steel, cwt. | Weight of pig, cwt. | Weight of scrap, cwt. | Weight of coke, cwt. | Weight of gas, cwt. | Weight of iron, cwt. | Weight of steel, cwt. |
|-----|-------------|---------------------|-----------------------|----------------------|---------------------|----------------------|-----------------------|---------------------|-----------------------|----------------------|---------------------|----------------------|-----------------------|
| 1 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 2 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 3 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 4 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 5 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 6 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 7 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 8 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 9 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 11 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 12 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 13 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 14 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 15 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 16 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 17 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |
| 18 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 | 1.10 |

From these figures it will be seen that the duration of the working of each charge varied from 30 to 50, or an average of 41 minutes. The time lost during two charges averaged 22 minutes, which carries the actual time of charge to 63 minutes. The 18 charges aggregated 13,229 lbs., while the quantity of puddled balls produced was 12,434 lbs. The consumption of coal was 4351 lbs., or 390 lbs. per 1000 lbs. of wrought iron produced. In this case coke to the extent of 15 per cent. of the weight of the pig was required for melting the iron in the cupola. Herr Petersen believes that it will be necessary, in order to produce good iron, to add pig containing some manganese, in order to retard decarbonization and help in the production of a fluid cinder.

The Ashtabula Bridge Disaster.—General Budlong A. Morton, an eminent engineer, of New Haven, has written the following in regard to the causes of the dreadful Ashtabula Bridge disaster in 1876: At the time this bridge was built the science of bridge building was in its infancy. It has scarcely reached a youthful stage at the present time. We had made a little progress in the study and knowledge of the elemental forces. Wind, a factor which was but little understood at that time, and whose variable forces are but slightly understood by a few at the present, was not considered to the extent of providing against its power. When we take into consideration the shape of the valley of the Ashtabula Creek from the bridge to the lake, together with the velocity of the wind at the time, we find, by the concentration of two currents of wind at the point of contact with the bridge, that the force applied laterally to the bridge exceeded 42,000 pounds. That, combined with the upper current of wind

from the northwest, striking the train at an angle of 45 degrees, at a velocity of 60 miles an hour plus the speed of the train, 15 miles, equal to 75 miles per hour, or a resistance of 23 tons to the square foot—this 23 tons per square foot to be overcome by traction upon the rails—would seem to clear away the mystery as to the cause of the accident. There was a pressure upon that bridge at that time that no human foresight could have foretold.

Delay in Assessing the Specific Duty on Hoop Iron Cut to Lengths.

(From our Special Correspondent.)

WASHINGTON, D. C., April 7, 1880.

The sub-committee charged with the formulation of a bill to cover the matter of the duty on hoop iron cut to lengths, appear to have found it impracticable to submit a proposition to the House within the limited time fixed by the letter of the Secretary of the Treasury to the Speaker of the House of Representatives. In consequence, the chairman of the sub-committee, Mr. Tucker, a few days ago addressed a letter to Secretary Sherman, requesting that an extension of the time for the change of duty be granted, so that the sub-committee might be able to prosecute their inquiries into this subject with care and deliberation. The Secretary instructed the officers of his department that his original determination, in regard to the duty on this class of iron, should not be carried into effect until the 17th of the present month, and so notified Mr. Tucker. Since that time the sub-committee have had several meetings, and, apparently, are no nearer a conclusion than when the letter of the Secretary to the Speaker was first referred to them. They have abandoned their original idea of giving hoop iron cut to lengths a commercial designation and fixing the duty at 35 per cent. ad valorem by specific legislation, and now propose to bring in a bill legalizing all purchases and authorizing a rebate of duty on all hoop iron cut to lengths imported prior to some designated date. This proposition is received with general favor by the sub-committee, but a most determined controversy has sprung up as to the date previous to which such rebate shall be allowed. The 20th of March, which was at first proposed, led to an extended discussion, in which it was indicated that Mr. Tucker was favorable to allowing the rebate on all importations prior to the passage of the act, and to fixing the specific duty on all importations after that date. From the present rate of progress it is very improbable that any action will be taken within the time as extended by the Secretary. It was intimated at the Treasury Department that, unless the sub-committee could show some reasonable effort to bring this matter into the House, no further extension would be granted, and the specific duty would be enforced immediately, subject to such legislation as might be agreed upon hereafter. The tariff men are extremely indignant at the vacillation of the Secretary in granting this additional time, as the notification previously given was amply sufficient to enable the sub-committee to report a measure. The extension of 17 days will accomplish no results, so far as legislation is concerned, and only adds to the time in which importers can bring into the country enormous supplies of hoop iron, cut to lengths, at the ad valorem rate, and thus glut the market with an inferior article and embarrass the home manufacturers. Mr. Tucker, however, says that he expects to be able to have a bill before the House in a few days, but this, from the present outlook, is extremely doubtful.

The Secretary of the Treasury has still under advisement the appeal of the New York importers, for a revision of the ruling of the Collector of the Port of New York respecting the duty on flat Bessemer rods used in the manufacture of barbed-iron fence. The importers ask for a classification at a lower rate than has been assessed and collected. It is expected that the reply will be ready during the present week.

Commercial Law.

Guaranty.—The guaranty of a note contained the clause: "And agree to pay all costs and expenses paid or incurred in collecting the same." Held that the guarantors were not liable, under this agreement, to pay for ordinary dunning or for preparing a petition which was not filed, no suit ever being commenced. —*Wetherbee vs. Kusterer et al.*, Supreme Court, Mich.

Mechanics' Lien.—After an iron mill had been in operation for many years, the plaintiffs furnished new boilers therefor, and placed them in a substantial new building, erected a short distance from the main mill, with which it was connected only by means of steam pipes. A mechanic's lien was filed against the entire works for the value of the boilers, &c., furnished to the one building. Held that where the materials or machinery have been furnished to a new building, intended to be used in connection with an old manufacturing establishment, the lien should be filed against the new building only, and not against the entire works. —*Wharton Bros. & Co. vs. Douglass & Son*, Supreme Court, Pa.

Interest.—Defendant made his note to plaintiff bearing 10 per cent. interest. It was not paid at maturity, and defendant claimed that it only bore 10 per cent. until maturity, and after that only the statutory interest, it not being provided in the note that it should bear 10 per cent. until paid. Suit was brought, and the lower court held that the payment of interest was a contract for a specified time, and that the contract expired with the maturity of the note. The upper court reversed the decision, and rendered judgment for plaintiff. —*Briscoe vs. Kinealy*, St. Louis Court of Appeals.

The steam catamaran now being built by Commodore William Voorhies, at Nyack, will be 200 feet in length and will have two cylinders, cigar shaped, each 5 feet 6 inches in diameter. The center of these cylinders will be of No 8 iron, weighing seven pounds per square foot. The ends of each will be of iron, weighing five and a half pounds to the square foot. Each will have four bulkheads,

comprising five air-tight compartments. They will be placed nine feet apart and decked over in the center for 125 feet. The saloon will be 125 x 25 feet. The wheel, 8 feet in diameter, will be located about 20 feet aft the midship section, and the dip of the blade will be 2 feet 8 inches, leaving the hub out of water. The boat will have two engines, capable of turning the wheel 325 times per minute. She will be furnished with a safety boiler of 102 inches diameter and 102 inches in height, with 750 feet 2-inch pipe inside coil, and 234 feet 4-inch, 70 feet 3½-inch, 35 feet 3-inch, 160 feet 2½-inch pipe outside coil. This boiler will carry 125 pounds per square inch. The commodore expects to obtain speed for the following reasons: First, the hulls are long and narrow; second, the draft of water amidships will be only 2 feet 8 inches, and it will gradually diminish, forward and aft, to nothing. The capacity of the catamaran will be 73 tons. The weight of cylinders, engines, boilers, wheel shaft and bearings, together with saloon and decks, being 39 tons, this will leave a carrying capacity for 475 passengers. Her power will be 476-horse. No other boat, it is claimed, has one-third this power per ton of displacement.

The American Society of Mechanical Engineers.

Pursuant to the call of the Committee on Organization, a large number of gentlemen desiring to become identified with the American Society of Mechanical Engineers, met on Wednesday, April 7, at 11 a. m., in the gymnasium of the Stevens Institute of Technology, Hoboken. In the absence of Mr. A. L. Holley, who was detained at home by sickness, Mr. Henry R. Worthington was called to the chair, and Mr. J. C. Bayles was chosen secretary. About 80 gentlemen handed in their names. The specific object of the meeting was to complete the organization of the society, by considering, amending and adopting the rules for the government of the society prepared by the Committee on Organization. These rules were read by Mr. Worthington, as chairman of that committee, and caused much discussion, but were finally adopted without important amendment. These rules divide those admitted to the association into four classes—members, honorary members, associates and juniors. Only mechanical, civil, military, naval, mining and metallurgical engineers and architects are eligible to full membership, and to secure this they must have been so connected with some one of these branches of the engineering profession as to be considered by the council competent to take charge of work, either as designers or constructors, or else have been identified with professional work as teachers or investigators. Honorary members, to a number not exceeding 25, may be selected from among engineers of recognized professional eminence who have retired from practice. Associates shall be persons having such knowledge of, or connection with, applied science as will qualify them to co-operate with engineers in the advancement of professional knowledge. Juniors must have been in professional practice not less than two years, or be graduates of an engineering school. The management of the business affairs of the society is vested in a council, consisting of the president, vice-presidents, managers and treasurer. The secretaryship is made a salaried office, to be filled and vacated by the council. The copyright of all papers accepted and read is vested in the society; but authors are perfectly free to give copies of their papers for publication to newspapers after they shall have been read, the society not being responsible for errors or omissions in such unofficial publication.

For purposes of organization, all persons present at the meeting and taking part in its proceedings were considered members—their status to be subsequently determined by the council. The meeting then proceeded to elect officers with the following result:

President—R. H. Thurston, Prof. Mech. Engineering.

Vice Presidents—H. R. Worthington, Hydraulic Engineer; Coleman Sellers, Mech. Engineer; Eckley B. Cox, Mining Engineer; Gen. Q. A. Gillmore, U. S. A.; Wm. H. Shock, U. S. N.; A. L. Holley, Mech. Engineer.

Managers—W. P. Trowbridge, Prof. Mech. Engineering; Theo. N. Ely, Supt. Motive Power, P. R. R.; J. C. Hoadley, Mech. Engineer; Washington Jones, Mech. Engineer; Wm. B. Cogswell, Mech. and Mining Engineer; F. A. Pratt, Mech. Engineer; Chas. B. Richards, Mech. Engineer; Wm. B. Bement, Mech. Engineer; S. B. Whiting, Mech. Engineer.

Treasurer—L. B. Moore.

After election the meeting adjourned, subject to the call of the council.

Between 1 and 2 o'clock p. m. the meeting adjourned for luncheon, and the gentlemen present were elegantly entertained by President Henry Morton, of the Stevens Institute, at his house near by.

The American Society of Mechanical Engineers is now successfully launched, and promises to have a long and useful life. The success of the undertaking is due very largely, and perhaps wholly, to Prof. John E. Sweet, of Syracuse, with whom the idea originated, and who has taken much trouble in recruiting a membership and creating among the profession an interest in the preliminary meetings for organization. As he has modestly refrained from accepting nomination for office, it would be a graceful courtesy on the part of the council to invite him to read the first paper at the next meeting.

A circular signed by M. Duclerc, vice-president of the French Senate, has been sent to the members of the Senate and Chamber of Deputies, setting forth a project for the construction of a maritime canal between Bordeaux and Narbonne, thus connecting the Atlantic with the Mediterranean. M. Duclerc urges the military, economical and commercial advantages of such a canal, and concludes by an appeal to the government to undertake the work, or at least aid in its execution. The scheme has been examined by a private company.

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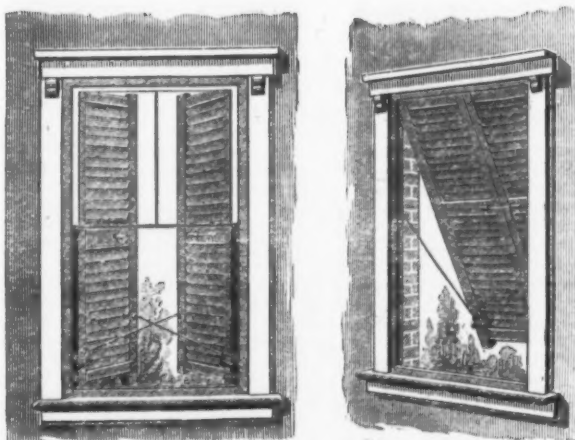
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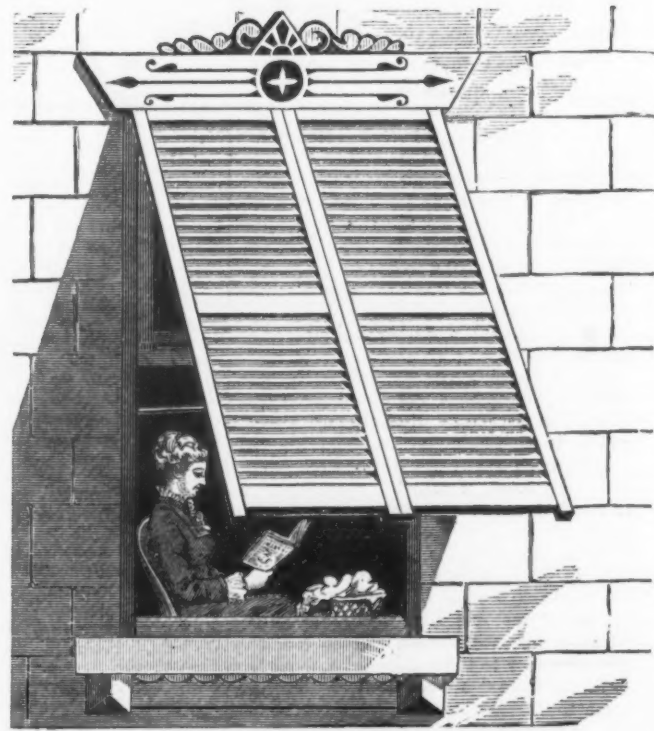
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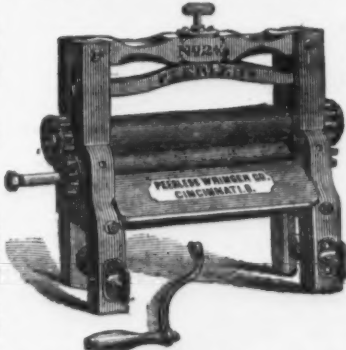
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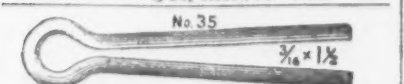
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For sale by BUTLER & HUNTING,
43 Day street, New York.



BROWNING, SISUM & CO., 85 Chambers St.,
Manufacture
Belt Hooks, Cutters, Spring Keys, D Rings,
Staples, and everything pertaining to wire bending.
Factory, BROOKLYN.

COVERT'S

Patent Improvement in

ROPE GOODS.

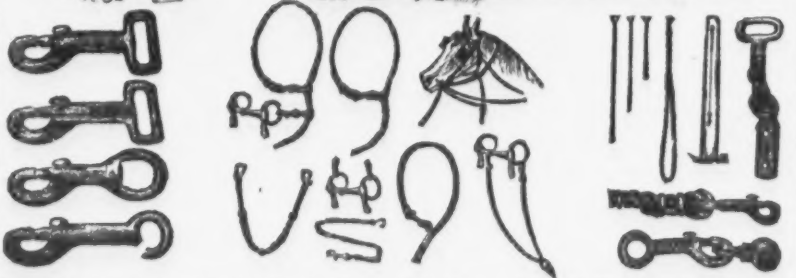
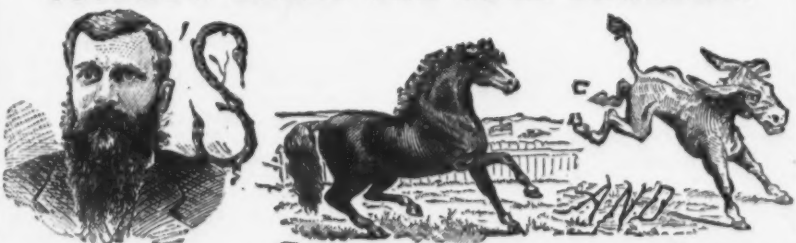
No more Splicing or Winding
Ends with Cord.

No. 1.

Rope Halters, Horse Ties, Cattle Ties, Halter Leads, &c., made by clamping the lap with steel rings, as shown in cut. Also, clamping the end with a ring to prevent unbraiding. This is all accomplished by machinery, and a superior article can be made at so much less cost, it will not pay any one to make up goods the old way. We are now prepared to furnish the trade the cheapest and best Rope Halters ever made. No. 1 illustrates the twisted and irregular form of the spliced Halter; also the insecure method of whipping the end with cord, which invariably comes off, and allows the rope to untwist. No. 2 illustrates the New Halter. It is made by clamping the laps with steel rings. The end is also secured with a steel ring, which will remain as long as the rope lasts. We have also a full line of

No. 2.

COVERT'S HORSE AND MULE JEWELRY.



Consisting of Covert's Celebrated Harness Snaps, Swivel Snaps, Open Eye Bit and Chain Snaps, Snap and Thimble for Horse and Cattle Ties, Rope Goods, consisting of Horse Ties, Cattle Ties and Halter Leads, Leather Horse Ties, Breast Chains, Halter Chains, Martingale Chains, Rein Chains, Post Chains, Post Rods, &c. These goods are far superior to anything of the kind on the market. They have from real merit become standard, and never fail to give entire satisfaction. They are sold by all leading jobbers in general and saddlery hardware at manufacturers' prices. Send for illustrated catalogue and price list. Address **COVERT MFG. CO.** Sole Manufacturers, West Troy, N. Y.

Delusion Rat and Mouse Trap,

Formerly manufactured by

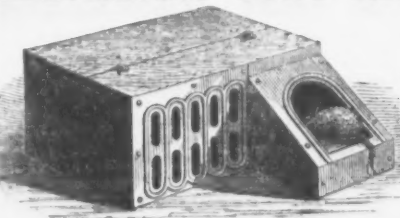
CLAUDIUS JONES & CO.,

At Bridgeport, Conn.,

Have Removed to **ERIE, PA.**

This is the most successful Rat and Mouse
Catcher on the market.

Send for Price List.



THE TURNER & SEYMOUR MFG. CO.,

WOLCOTTVILLE, CONN.,

MANUFACTURERS OF

Upholsterers', Stationers' House Furnishing & Fancy
HARDWARE AND NOTIONS.



We take pleasure in calling the attention of the trade to our
Improved Family Egg Beater.

It is made the same as our former Beater, except that we use parallel round wires in place of the flat wire. It is more easily cleaned than the flat wire beater. It is equal to any beater in the world, while the price is very low. We guarantee that the Improved Egg Beater is not an infringement on the Dover, or any other beater.

Our **Cast Scissors and Shears** are superior in shape, variety and finish to all others. We have added to our former line a great variety of nickel-plated Scissors and Shears, Nut Picks, Nut Crackers, Fruit Knives, &c. We respectfully solicit the privilege of giving estimates on novelties in Brass or other metals, and on small iron castings.

SPECIALTIES.

Shade Fixtures in great variety.
Picture Nails, Knobs, Hooks, Cord
Wire, &c.
Twine Boxes, Escutcheon Pins, Cur-
tain Rings, Nutmeg Graters.



WM. H. HASKELL & CO.,

Pawtucket, R. I.

MANUFACTURERS OF

COACH SCREWS

(With Gimlet Points),

ALL KINDS OF

Machine and Plow Bolts,

FORGED SET SCREWS,

AND

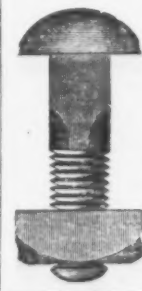
TAP BOLTS.

RHODE ISLAND HORSE SHOE CO.,

MANUFACTURERS OF

Horse, Mule & Snow Shoes of the Perkins Pattern.

Works at Valley Falls, R. I., and Buffalo, N. Y. Office, 31 Exchange Place, Providence, R. I.
F. W. CARPENTER, President. C. H. PERKINS, Gen'l Manager. E. W. COMSTOCK, Secretary



CROSS CUT SAWS.

Caution to Manufacturers of, Dealers in, and Users of Cross-Cut Saws and One-Man Cross Cuts:

Dealers in and Manufacturers of Saws, and Hardware Dealers generally, are hereby notified that the undersigned are the owners of the reissued Patent for Saw Handles, No. 8996, Nov. 18, 1879, original patent, Jan. 18, 1870.

Every Cross-Cut Saw having a handle, part of which, adapted to one hand, is above the blade, and part, adapted to the other hand, opposite the end of the blade, is an infringement of the said patent, and prompt legal proceedings will be taken against manufacturers of and dealers in saws provided with such handles.

The following is the claim on which we rely:
 "In a cross cut saw, the combination of the saw-blade with a handle, part of which, adapted to one hand, is above the said blade, and part, adapted to the other hand, directly opposite the end of the said blade, all substantially as set forth."



HENRY DISSTON & SONS,

KEYSTONE SAW WORKS, Philadelphia, Feb. 17, 1880.

HOWSON & SON, Philadelphia and Washington, Attorneys for DISSTON & SONS.

Bergen Port Spelter

MINES: Lehigh Valley, Pa. WORKS & FURNACES: Bergen Port, N. J.
 The only Mines and Manufacturers of

PURE LEHIGH SPELTER
 From Lehigh Ore.
 Especially adapted for Cartridge Metal and German Silver.

Also manufacturers of **BERGEN PORT OXIDE ZINC.**

Superior for Liquid Paint on account of its body and wearing properties.

F. OSGOOD & CO., Proprietors.
 E. A. FISHER, Agent, 13 Burling Slip, N. Y.

THE Sprague Novelty Works,

15, 17 & 19 North Water Street,
 ROCHESTER, N. Y.,
 Manufacturers of

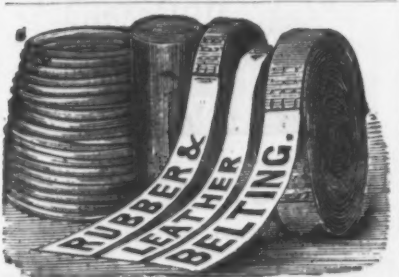
Hardware Specialties, SPRAGUE'S

"Perfection," "Combination" and other Razor Stropps.
 Refer to The Iron Age first issue of each month.



Lemon Squeezer.

A New and Important Invention.
 The operation is by a presser lever, standard link-supporting ring, guide rods, a cup, convex bed perforated. The lemon is cut in half, and the edges are spread out when pressed; this insures uniformity of pressure, breaking the cells of the lemon and extracting all the juice. A box of lemons can be squeezed in twenty minutes.
 ROBERT UNDERDONK, Sole Manufacturer,
 405 Grand St., New York.



PECK & BENIS, Jobbers of Rubber Goods, Manufacturers of Leather Belting and Leather Fire Hose. Sole agents for Hoyt's celebrated Oak Tanned Belting, also N. Y. Belting and Packing Co.'s goods. Ladies' and Gents' Water-proof Garments. 175 Superior St., Cleveland, O.

CUPOLAS
 FOR MELTING IRON. Please state how many tons you wish to melt per hour. Send for description and price.
 CHARLES T. HARRIS,
 30 Cortlandt St., New York.

BLACK AND TINNED IRON RIVETS.

| | | | | | | | | |
|-------|-------|-----------|-----------|-------|-------|-------|-------|-------|
| 5 oz. | 1 lb. | 1 1/4 lb. | 1 1/2 lb. | 2 lb. | 4 lb. | 6 lb. | 7 lb. | 8 lb. |
|-------|-------|-----------|-----------|-------|-------|-------|-------|-------|

W. P. TOWNSEND & CO.,
 PITTSBURGH PA.,
 Manufacturers of every description of First Quality **RIVETS.**

"PINNACLE" SASH LOCK.
 BURGLAR PROOF.
 In locking, the arm is brought forward, and the spring bolt engages with the post in the back plate. In unlocking, the knob is pulled out, and the arm throws back, where it is held. Only one spring is used in the lock.
PAYSON MFG. CO.,
 CHICAGO.

Iron and Brass Wood Screws.
 We manufacture a full line of **IRON AND BRASS SCREWS.**
 Quality, finish and tests as to strength, guaranteed equal to any in the market.
 With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts.
Philadelphia Screw Co., Limited,
 Twelfth and Buttonwood Streets,
 PHILADELPHIA.

SABIN MFG. CO.,
 MONTPELIER, VT., MANUFACTURERS OF
DOUBLE-ACTING SPRING BUTTS,
SABIN'S LEVER DOOR SPRINGS, For heavy doors,
BOSS AND CROWN SPRINGS, For light doors.
 Send for Catalogue.

JAMES, AIKMAN & CO.'S
 PATENT IMPROVED METALLIC
EXCELSIOR REFRIGERATOR
 Manufactured by
JAMES, AIKMAN & CO.,
 No. 25 Cliff Street, New York.
 For Sale by W. W. Montague & Co., San Francisco, Cal.; Wm. Blair & Co., Chicago; F. H. Lawson & Co., Cincinnati.



It is made of galvanized iron, circular in form, set on casters, wastes no room, and is light and easily moved. The outside is painted in imitation of oak. The interior is arranged with rotary adjustable shelves, which can be regulated at pleasure. The double cylinder forming an air-tight chamber, in connection with the arrangement of the ice-chamber and the ventilator, makes the action of the Refrigerator perfect, and all the parts are so arranged as to be easily kept clean and sweet. The provision chamber, being under and separate from the ice-box, is free from ascending vapors. It is the only Refrigerator that imparts no taste or smell to its contents. It contains a water-cooler, furnishing ice-water without additional expense.

| No. | Diameter. | Height. | Price. | No. | Diameter. | Height. | Price. |
|-----|------------|------------|---------|-----|------------|------------|---------|
| 20 | 21 inches. | 34 inches. | \$17.00 | 24 | 25 inches. | 39 inches. | \$26.00 |
| 22 | 23 " | 36 " | 21.50 | 27 | 28 " | 41 " | 34.00 |

Discount.

THE BUCKEYE LAWN MOWERS.



SENIOR BUCKEYE.
 10 inch.....\$14.00 16 inch.....\$22.00
 12 inch.....18.00 18 inch.....24.00
 14 inch.....20.00
JUNIOR BUCKEYE.
 10 inch.....\$13.00
 12 inch.....14.00
 14 inch.....16.00

The lightest and easiest running Mower in the market. It is unequalled for simplicity, strength and durability. It is compact, thoroughly made and beautifully finished. Every Mower warranted as represented.
 Send for circulars and terms to

MAST, FOOS & CO.,
 SPRINGFIELD, OHIO.

PARAGON FLY TRAPS.

THE OLD WAY.

 The "Paragon" Trap is equal to any in the market. Made of best material by good workmen. We guarantee each trap to be perfect. We solicit a sample order. Correspondence with jobbers solicited.

BROMWELL M'FG CO., Sole Manufacturers,
 181 WALNUT STREET, CINCINNATI.

HOOPES & TOWNSEND,
KEYSTONE BOILER RIVETS
PHILADELPHIA.

WM. R. HARTIGAN, Burlington, Ct.,
 Manufacturer of all kinds of
TOOL HANDLES AND SEAT STICKS FOR CARRIAGES, &c.
 Also all kinds of Enamelled Goods made of wood, such as Drop Knobs, Furniture Knobs, Orgue Stops, Brush Handles, &c. Also sole manufacturer of the Patent ANTI-NEUROUS TRIANGULAR PENHOLDER.
 Send for Catalogue and Price List before purchasing.
 F. R. EMMONS, Agent 45 Warren St., New York.
 Manufacture at BURLINGTON, Conn., U. S. A.

EXCELSIOR LAWN MOWER



Roller Mower.

We solicit correspondence from the trade for prices and discounts.

We make Seven Sizes of Roller Mowers and Six Sizes of Side-Wheel Mowers. We claim for our Mowers

Perfect Work, Light Draft and Simplicity.

We have received many first premiums in competitive trials with other Mowers, both in this country and abroad. We have special patterns of Mowers for export, meeting the requirements of every market. Our new Horse Mower is conceded to be the *Lightest and Best Horse Lawn Mower* ever made. N. B.—We make no inferior or second quality Mower; Horse and Hand Lawn Mowers are alike guaranteed in all respects. Send for Illustrated Catalogue. Address



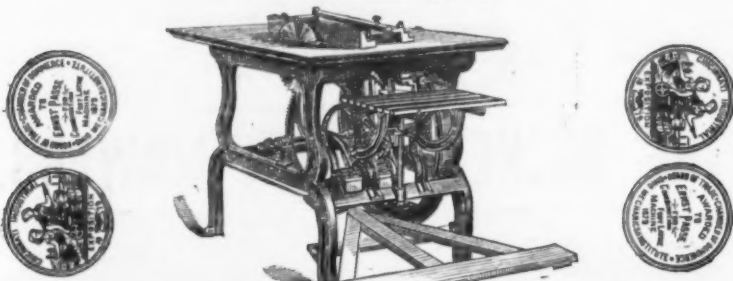
Side-Wheel Mower.

CHADBORN & COLDWELL MFG. CO., Newburgh, N. Y.

E. PASSE, Proprietor

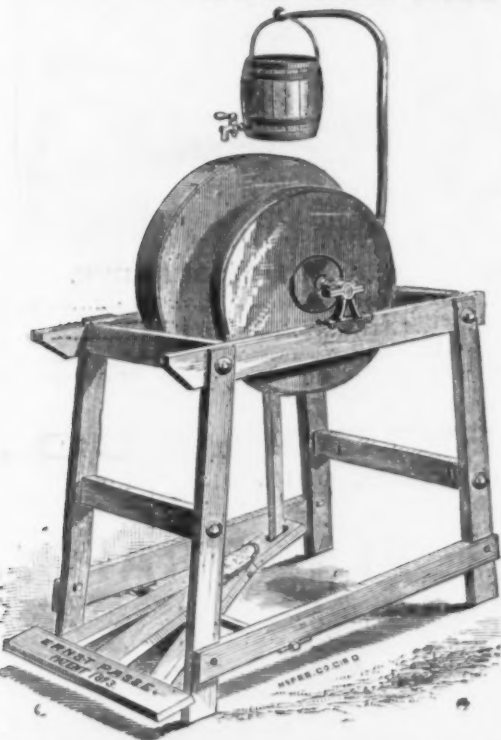
CHAS. PASSE, Superintendent.

Universal Machine Works,
CINCINNATI, OHIO.
Established 1876.



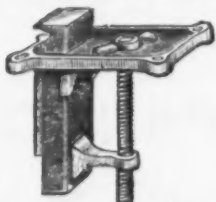
GRINDSTONE FRAME. New Improved for Foot Power.
Diameter of stone 20 in., \$5.00; 30 in., \$6.00. Price without stone.

Foot-Power Wood-Working Machines, for Manufacturers' Purposes, Iron Frames; Rip and Cross-Cut Saws, Scroll Saws, Boring Machines, Turning Lathes, Drill Presses, &c.
Plans for Factory Purposes, Free-Hanging Drill Presses for Heavy Work, Upright and Bench Drills, Single and Double-Headed Frizers, Tools for Machines of every description.



The excellence of this superior stone cannot be too highly appreciated by Farmers and Manufacturers. The builders of Reaping and Mowing Machines readily admit and recommend that my Grindstone is best suited for sharpening the knives of such machines. It is portable, light, durable and fast cutting. The frame is made exclusively from hard wood, and every joint is bolted. Carpenters, Stair Builders, Furniture Manufacturers and Butchers will do well to pay special attention to this tool. It is made for two stones; one for light work, the other for the heaviest grinding. Parties having Frames and wanting Fixtures can get them on short notice.

TESTIMONIAL.
CINCINNATI, December 17, 1878.
We are using Ernst Passe's Patent Grindstone, and find it to be the most complete and conveniently arranged Grindstone we ever knew of.
MORRIS SASH LOCK MFG CO.,
George McGregor, Sup't.



Improved Bench Stop for Carpenters.
All Malleable Iron.
This tool is improved in every particular point. It works by a double-headed screw.

COULTER, FLAGLER & CO.,

87 Chambers and 69 Reade Sts., New York,



Forsyth's Patent Roller Skate. Patented Feb. 12, 1878.

Hardware Manufacturers' Warehouse.



"THE BOSS" JACK-SCREW.

R. D. WYNN,

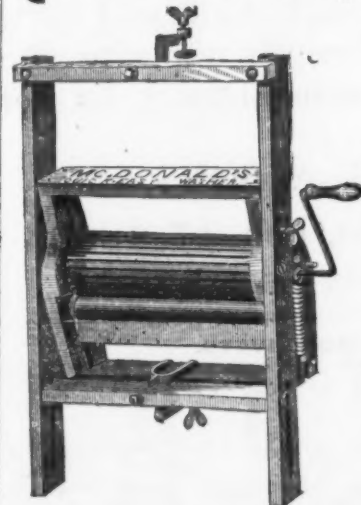
Windsor, Vt., U. S. A.,

Sole manufacturer of the above Screw. Indorsed by builders, railroad and mining men as the best screw jack in the market. Also manufactures Press Screws, Lard and Wine Presses, Tackle Blocks, &c. Circulars and prices, address as above. (Please say *The Iron Age*.)

Agents: (Pugsley & Chapman, 8 Liberty St., New York. Sam'l May & Co., 15, 16 & 20 Oliver St., Boston.)

McDONALD'S QUICK AND EASY WASHER.

THE MOST THOROUGH AND PERFECT WASHER IN THE WORLD.



SAVES THE LINEN,
SAVES SOAP,
SAVES TIME.

A Day's Wash can be done in two hours. It will fit all kinds and sizes of Tubs.

ALSO,

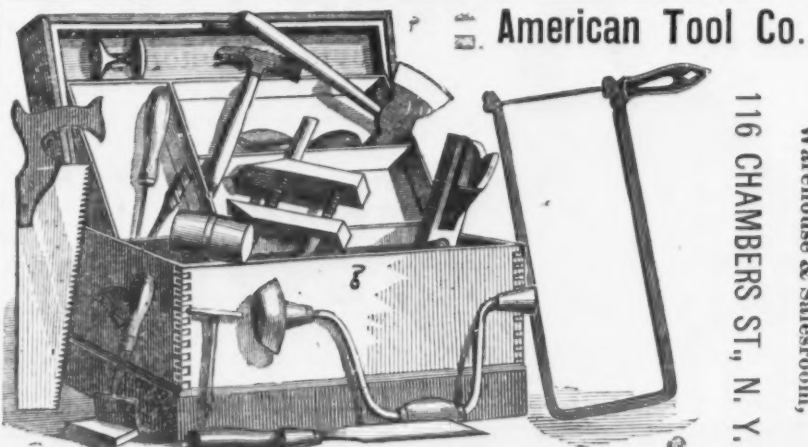
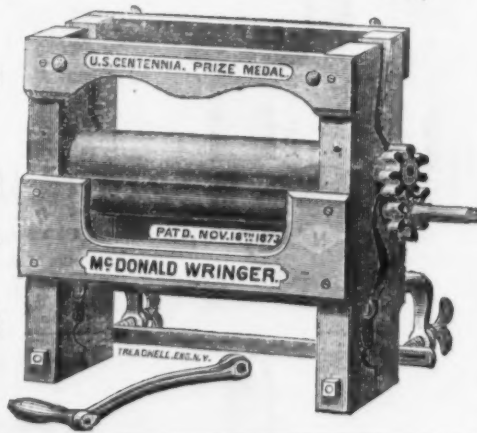
McDONALD'S Centennial Prize Wringer.

Warranted Superior TO ANY WRINGER In the World.

IT SELLS ON SIGHT!

Address all inquiries and send all orders to

Graham & Haines
113 Chambers St.,
NEW YORK.

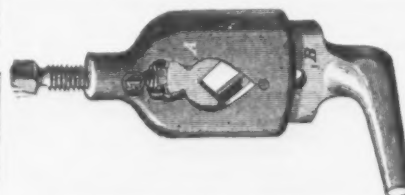


TOOL CHESTS OF EVERY DESCRIPTION.

Fitted up with a superior quality of Tools, and adapted for the home and export trade. Illustrated descriptive catalogue furnished on application. Mechanics' Tools and Hardware specialties.

NORTH'S PATENT

Universal Lathe Dog.



SELDEN C. NORTH, No. 347 North Fourth Street, Philadelphia, Pa.



See our advertisement in *The Iron Age* first issue of each month.

Beardsley Scythe Co.,
Manufacturers of
GRASS, GRAIN & BUSH SCYTHES,
Hay Knives & Corn Knives.
West Windsor, Conn.

Wiley & Russell Mfg. Co.,
GREENFIELD, MASS.

Lightning Screw Cutting Machinery and Tools.

Bolt Cutters for hand or power.
Lightning Screw Plates.
" Taps and Dies for Pipe.
" Bit Brace Reamers.
Green River Drilling Machines for hand or power.
Green River Tire Benders.
" Upsetters.
" Horse Shoers' Vises.
Tire Bolt Wrenches, Tire Wheels.
Nut Wrenches and other Labor-saving Tools.



Special Screw Plates arranged for use either with Stock or in Bit Brace, for Carriage Makers, Pump Makers and Stove Makers.
Send for Illustrated Price List.

Castle Hose Reel and Carriage.

Patented 1878.

The most perfect device yet invented for handling small hose. The only adjustable Reel in the market. Write for discounts.

CASTLE HOSE REEL CO., Cleveland, O.

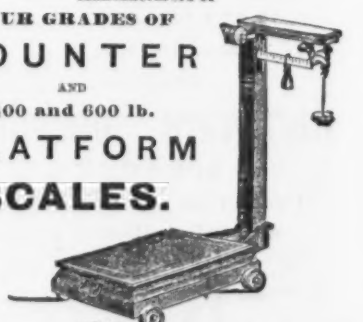


Southwark Hardware Co.

PHILADELPHIA, PA.,

Manufacturers of

FOUR GRADES OF
COUNTER
AND
400 and 600 lb.
PLATFORM
SCALES.



EQUAL TO THE BEST AND LOWER IN PRICE.
Send for Illustrated Catalogue.

NATIONAL BOLT CUTTERS
GUARANTEED AHEAD OF ALL OTHERS FOR MANUFACTURERS & MACHINISTS.
SEND FOR CATALOGUE
182 SENECA ST. CLEVELAND, O.

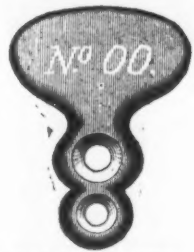
W. & J. TIEBOUT,

Manufacturers of

Brass, Galvanized & Ship Chandlery Hardware,

No. 33 Chambers St., New York.

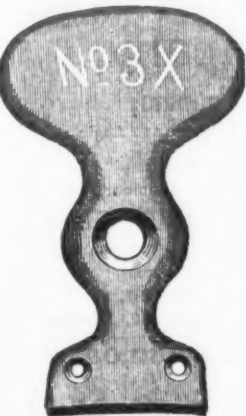
THOMAS MORTON,
65 Elizabeth Street, New York,
Manufacturer of Copper and Iron
SASH CHAINS,
With Patent Attachments.
Warranted for years. Chains of any size made to order, and trade supplied with liberal discount.



For Ladies and Misses.



For Counter Stiffeners only.



For 1 1/2 inch Heel.



For 1 1/2 inch Heel.



For 1 1/2 to 1 3/4 inch Heel.



For 1 3/4 to 2 inch Heel.

BY SPECIAL ACT

OF THE

46th

CONGRESS,



APPROVED

BY THE

PRESIDENT

April 1, 1880,

the Commissioner of Patents is **DIRECTED** to correct Letters Patent dated July 9, 1872, No. 128,843, and erroneously granted to Barsaloux, James & Lyon for a Metallic Stiffener for Boot and Shoe Heels, known to the trade as

LYON'S PATENT METALLIC HEEL STIFFENER.

The bill furthermore says that when said Letters Patent is corrected it shall be as good and valid as it would have been had it been issued in such corrected form.

These Heel Stiffeners are being advertised in
OVER 1700 NEWSPAPERS,
And their sales are doubling every year.

ALL TO WHOM IT MAY CONCERN:

Take notice, that on and after this date any one who shall

SELL, MANUFACTURE or USE

a Metallic Stiffener made to fasten to the side of the Heel by screws, nails or barbed tangs, and extending up against the counter to prevent it from bending or breaking over, or extending the same down to the bottom of the heel to protect it from wearing off unevenly,

Infringes on above Letters Patent,

and will be held responsible for full price of goods as below given, also damages and costs for collecting the same.

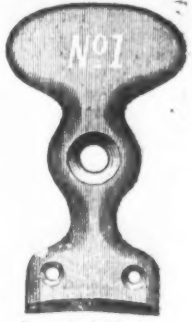
No. 00 and No. 1, per doz. pairs, 90 cts.
All other sizes, " " \$1.10
One gross, 144 pairs, - - \$12.50
Two gross, \$15.00 per gro., discount 20 per cent.

WM. H. KING,

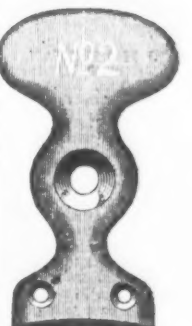
of New York City,

ATTORNEY FOR NELSON LYON.

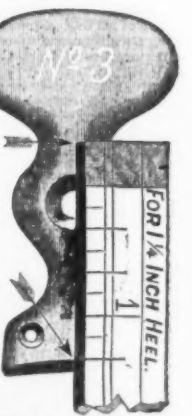
All infringements will be promptly prosecuted.



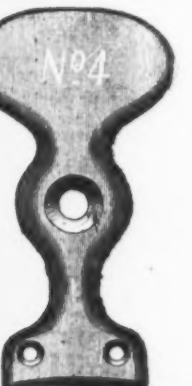
For 1 inch Heel.



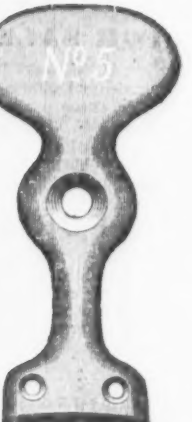
For 1 to 1 1/4 inch Heel.



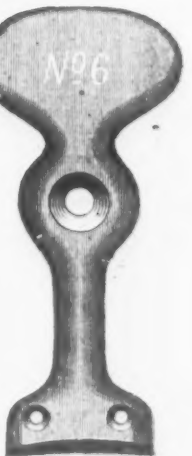
For 1 1/4 inch Heel.



For 1 1/4 inch Heel.



For 1 1/2 inch Heel.



For 1 3/4 inch Heel.

The above quantities will be required to be taken each time to get their respective discounts. Ten and 25 gross lots will be sold only to those who will sign contracts to keep above prices, and discounts for same will be given on application. All goods must be marked "Patented July 9, '72," and all boxes containing same must be marked "Manufactured only by Nelson Lyon, Albany, N. Y., under Patents of July 9, 1872, May 18, 1873, July 11, 1876."

MANUFACTURED ONLY BY

NELSON LYON,
ALBANY, N. Y.

Experiments are in progress at the Holyoke Water Power Company's flume, to determine how much power is lost by transmission through gears and belts. In the regular turbine tests the dynamometer is placed at the end of the vertical shaft on which the wheel hangs, but in these experiments it is put at the most distant point to which the power is transmitted. The tests with gears are made with a pair of beveled gears between the wheel shaft and the jack shaft, and a spur gear connecting the latter with what answers to the main shaft in a mill. Experiments are made first with one pair of gears and then with two, and finally with belts in the place of both. Then the wheel is tested in the usual way, and it is easily found how much power is lost and whether belts or gears take the most.

Special Notices.

COMMISSIONER'S SALE.

J. H. HILLMAN, THOS. T. HILLMAN, and GEO. S. WHARTON, Plaintiffs, vs. DANIEL HILLMAN, ex parte petition.

By virtue of a judgment rendered in the above-named cause, at the February term, 1880, of the Trigg Circuit Court (for the settlement of partnership), I will, on MONDAY, the 10th day of May, 1880 (being County Court day), at the first court of the County of Madison, Ky., sell to the highest bidder the Tennessee Rolling Mill and lands attached, situated on the Cumberland River, in Lyon County, Ky., and 10 miles from Eddyville and Elizabethtown and Paducah Railroad. The mill consists of the following machinery: one Plate Mill, 6 x 26; two High Rolls, driven by 60 x 20 Engine; one Steam Hammer, 10-ton, 5-ton and 4-foot stroke; one Plate and Sheet Mill, 76 x 22; one 16-inch Bar Mill, train complete; one 9-inch Bar and Rod Mill; one 8-inch Bar and Hoop Mill; nine Puddling Furnaces; thirteen Knobs; fifteen Boilers; twelve Engines, large and small; Muck Train, Burden Squeezers, &c.; one Run-out Fire; seven Heating Furnaces; two Annealing Furnaces; seven pair Shears; one Steam Saw; one Testing Machine; Railroad Tracks and Scales; full sets of all tools needed; Storehouse, Office, Warehouse, Dwelling and many workmen's houses, with about 500 acres of land, about 500 acres of which are in cultivation.

I will also, at the same time and place, sell the Trigg Furnace, situated about three miles from the Cumberland River and four miles from said mill, in Trigg County, Ky. Said furnace is first class; built in 1871; Charcoal Furnace, 4 feet high, 12 feet bore; sixty-pipe Davis Hot Blast; four Boilers; Horizontal Engine, 6 feet stroke, 20 inch diameter; furnace arranged for Cold or Hot Blast, and makes first-class iron; Storehouse, Offices, Dwelling, and all necessary workmen's houses, &c., and about 400 acres of land, with about 60 acres in cultivation.

This property will be sold on the following terms: If rolling mill and lands are sold together, a credit of one, two, three and four years will be given. Trigg Furnace and lands on same terms. If the machinery should be sold separate from the lands, the terms for it will be one-third cash, balance in six and twelve months. The purchaser will be required to execute bonds for the purchase money, payable to the Commissioner in the nature of replevin bonds, with good and approved security, bearing interest at the rate of 6 per cent. per annum from date till paid, and a lien retained on the property for the purchase money.

J. H. Hillman, at Tennessee Rolling Mill, will take pleasure in showing the property to any one desiring to look at same.

CADIZ, KY., March 4, 1880.

THOMAS H. GRINTER, Special Commissioner.

For Sale at a Bargain.

Factory property in Naugatuck, Conn., with water power; completely equipped for the manufacture of Cutlery, Shears, or other light metal goods. Thorough investigation invited. Apply to

TUTTLE & WHITEMORE, NAUGATUCK, CONN.

Bissell & Welles, Wholesale Hardware Auctioneers, 83 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and importers.

FOR SALE, CHEAP.

A Second-Hand 5-horse-power Portable Engine and Boiler (Economiser, built by Porter Mfg. Co., Syracuse, N. Y.); nearly new and in perfect order. For particulars, call on or address

THE RENZ HARDWARE CO., Bridgeport, Conn.

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Stock of General Hardware, Store Building and good Dwelling connected. Situated in a small town, and one of the best grain markets in Ohio. Good opening for an energetic man. For particulars address

Lock Box 186, Canton, Ohio.

THIRTEEN'S SALE OF VALUABLE IRON PROPERTY.—Two NEW CHARCOAL BLAST FURNACES, FORTY-FOUR THOUSAND ACRES OF VALUABLE LAND.—Pursuant to a mortgage executed by James Woods, Jr., Yeatman and James Woods, Jr., registered in the Register's Office of Stewart Co., Tennessee, in book 24, pages 410 to 412, inclusive, the undersigned will sell on the premises, for cash, on the 1st day of March, 1880, that very valuable iron property located in Stewart County, Tennessee, known as Cumberland Iron Works. Parties wishing full information will please address the undersigned, care of Third National Bank, Nashville, Tenn.

V. L. KIRKMAN, Trustee.

SITUATION WANTED.—By a Mechanical Engineer who has had upward of 25 years' experience as Machinist, Draughtsman, Foreman and Superintendent of the making of Machinery of almost every kind. Is thoroughly acquainted with Blast Furnace Machinery and fixtures, Rolling Mill, Nail Factory, and Bolt and Spike Works, in all their details, including the designing and erecting the works, also Mining Machinery of all kinds and the repairing of all the leading donkey pumps made. Best of references given.

Address: MECHANICAL ENGINEER, Office of The Iron Age, 83 Reade St., New York.

FOR SALE.

Job Lots and Bankrupt Stocks Hardware.

Great bargains offered to the trade.

A. W. WHEELER, 141 Lake St., Chicago.

FOR SALE.

The Right of the United States of a first-class Adjustable Chain Pump Bucket, with self-evident advantages. Can be adjusted to fit the tube, and enlarged in case of wear, hence the pumps can be kept in good working order. Also the entire Canadian Right for sale or lease on royalty. Address:

THOMAS KENYON, Patentee, Box 103, Hamilton, Ohio, U. S. A.

FOR SALE OR LEASE.

A PRACTICAL MAN, who has had over thirty years' experience in making steel in some of the leading houses in England and America, is open to an engagement. Good reference. Address:

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FOR SALE.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address: HARDWARE, Box 366, Salina, Kansas.

FOR SALE.

WANTED.—Contract for a special Iron and Steel Works Plant under patent rights. Special terms to Engineers and Boiler Makers. For particulars, address F. R. G. S., Drawer D D, Philadelphia, Pa.

FOR SALE.

Christiania Rolling Mill Property, situated on the south side of Christiania Creek, Wilmington, Del. Main building, 90 x 130 feet, containing two trains of Rolls 30 x 96 inches, and 36 x 72 inches. Complete in all its appointments for a first-class Plate Mill. Or, will sell an interest to a person having capital, experience and capable of conducting the business. Apply to

LOBDELL CAR WHEEL CO., Wilmington, Del.

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Special Notices.

FOR SALE.

The Salisbury Iron Manufacturing Co., of Virginia, situated nine miles from Fincastle, in Botetourt County, Virginia. There are on the property at the Furnace, several Houses, a Storehouse, Grist Mill, Blacksmith Shop, Stables, &c., all of which are owned by the property. The Furnace is in good order, having in the shed close to the furnace 20,000 bushels of Charcoal and 200 cords of oak wood, cut and stacked in cords on the property. The Ore Bed is four miles from the Furnace, and opened about 200 feet in the face of the mountain. Water is taken a mile on the side of the mountain in a flume, and falls down on the earth on the top of the ore bed, the mud and water passing through a creek into the James River. The ore in the bed is shoveled into a trough, or flume, with ripple bars, and a stream of the mountain water let in; before it reaches the bottom it is washed clean. Iron, acknowledged as good as the Salisbury for car wheels, has been made here for eight years, and sold for car wheels to different parties around New York, but principally to A. Whitney & Sons, of Philadelphia, and Bouton & Co., of Chicago.

The property, besides having water communication with Lynchburg and Lexington, will have, within a few months, communication with the Chesapeake & Ohio R. R. at Clifton Forge, the railroad now being made from Buchanan to Clifton Forge, and runs along the James River, within half a mile of the ore bed. The property owns 3000 acres of land, 2000 of which can be and is partly used for farming, the other 1000 acres is covered with large oak timber. Timber land can be had for a few dollars per acre, or the wood at a nominal price. The late Jacob Dakin was the Manager and half owner of the property. Since his death, in 1877, it has remained idle. If acceptable security be offered, no money for years will be required. It is offered for sale at a sacrifice by

EUGENE KELLY, 45 Exchange Place, New York,

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New York, March 22, 1880.

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Merchant Bar Iron, Hammered and

Rolls Axes, Car Forgings, Bridge

Work, Fish Joints, Bolts, & R. R.

Spikes, Bolt Ends, &c., &c., LANCASTER, PA.

WANTED.

A Shear for splitting old rails lengthwise, with knives from 24 to 30 inches long. Address

PENN IRON CO., LIMITED, Lancaster, Penn.

A Woodruff & Beach

Beam Engine,

Low pressure, 48-inch cylinder, 84-inch stroke, with fly-wheel pulley 30 feet diameter, 36-inch face, and

Four Tubular Boilers,

60 inches in diameter, 30 feet long, and all connections practically as good as new.

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The Geo. Place Machinery Agency,

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European Representatives of First-Class American Houses,

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TERMS ON APPLICATION.

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Stock of Hardware, Stoves, Implements, Tinners' Tools and Stock, in South Western Iowa.

Address: Y, Office of The Iron Age, 83 Reade St., New York

For Sale.

A Machine to Punch Axe Poles—Cohoes Pattern, with Shop or State Rights.

Address: "BOLTON," Office of The Iron Age, 83 Reade St., New York.

For Sale.

A Pick and Mattock Machine to Punch solid or tip Eyes, with Shop or State Rights.

Address: "MILTON," Office of The Iron Age, 83 Reade St., New York.

Wanted.

50 Horse Engine.

New or Second-hand, Corliss, Brown or Buckeye make. Also Planer, 36 x 16 in. 25 feet.

STILES & PARKER PRESS CO., Middletown, Conn.

FOR SALE OR LEASE.

The Right of the United States of a first-class Adjustable Chain Pump Bucket, with self-evident advantages. Can be adjusted to fit the tube, and enlarged in case of wear, hence the pumps can be kept in good working order. Also the entire Canadian Right for sale or lease on royalty. Address:

THOMAS KENYON, Patentee, Box 103, Hamilton, Ohio, U. S. A.

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E. S. Wheeler & Co.,

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NEW YORK,

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Valuable Property For Sale.

Charcoal Iron Furnace (hot blast), Ore

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Dwelling Houses, Farming

and Wood Lands, in

Harford County,

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This property, known as "The Harford Furnace and Chemical Works," containing upward of 2000 acres of land—nearly 1000 acres under cultivation—is situated at the head of Bush River, about one mile from navigation and 1/4 miles from Perrymanville Station, P. W. & B. R. R., in a healthy and desirable neighborhood. The furnace is in good condition, of 20 tons capacity per week, and could be started with very little delay. It has connected with it Ore Banks, Ore and Charcoal Kilns, Grist Mills, Storehouse, and all necessary dwellings for hands, superintendent and proprietors. It has also large substantial buildings for the manufacture of chemicals from wood by carbonization. This property will be sold for less than one-third of its actual cost to the last owner. The terms will be made to suit purchaser. Address

EDWIN H. WEBSTER, Atty. at Law, Belair, Harford Co., Md.

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Engine and Boiler, 35-horse power.

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with valuable patents and a large home and foreign trade. Cause of sale, old age.

Inquire at factory, 62 and 64 Railroad avenue, Newark, N. J.

F. MEYERS.

Canadian Mines, Iron, Lead, &c.

Mining properties, ores and minerals bought on commission. Mineral territories prospecting.

Address: SAMUEL D. MILLS, Mining Manager, Mineralogist, &c., 64 Clarence St., Kingston, Ontario, Canada.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address: HARDWARE, Box 366, Salina, Kansas.

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NEW AND SECOND-HAND

MACHINERY.

STEAM ENGINE MACHINERY.

One Delamater Sugar-house Engine 26 in. x 48 in.

One Corliss 40 horse power, 10 in. x 24 in.

Five Horizontal Engines, new 9 in. x 16 in.

Four " 15 1/2 in. x 30 in. Tubes.

One Portable Engine, 5 horse power.

One Hoisting Engine, 12 in. x 16 in.

One Upright Engine, 16 in. x 36 in. [forty.

One Horizontal Engine, 14 in. x 36 in. [forty.

One " 15 1/2 in. x 30 in. Tubes, Todd & Raf.

One Upright Engine, 7 1/2 in. x 10 in.

One " 12 in. x 16 in. Tubes.

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Special Notices.

TO THE
HARDWARE TRADE.

In January last the firm of Clark & Co., manufacturers of Builders' Hardware, Buffalo, N. Y., was dissolved by limitation of partnership. The undersigned senior member and founder of said company withdrew his entire interest and management in the late company aforesaid, the remaining members agreeing to assume all debts and obligations contracted by the late firm.

C. B. CLARK, W. E. ANTHONY, E. G. COPELAND.
We shall in April begin the manufacture of Builders' and Miscellaneous Hardware, including

- Clark's Patent Blind Hinges,
- " " Gate Hinges,
- " " Mop Heads,
- " " Mop and Brush Holders,
- " " Axle Pulleys,
- " " Stove-Pipe Dampers, &c.

Also Clark's New Reversible Curtain Fixture.

Our Mr. C. B. Clark was the founder and senior member of the late Clark & Co., Buffalo, N. Y., and the patentee of the above well-known articles, which fact is a guarantee for the excellence of our goods, and we would respectfully solicit a share of your patronage.

C. B. CLARK MFG. CO.,

285 to 291 Atwater St., Cor. Rivard,
DETROIT, MICH.

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Bit Brace Wrench

are now ready. This tool possesses every advantage of the ordinary Bit Brace, and will also turn with rapidity Nuts and Bolts from 1/2 to 1 1/2 inches.

Q. S. BACKUS,
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Splendid Investment.

The noted Carter's Furnace Iron property, in Carter county, East Tennessee, for sale; 18,000 acres, fine timber, labor abundant and cheap, magnificent water power, one five-ton cold blast charcoal furnace; best car wheel iron, now yielding large profit. Best New York and Tennessee references. For terms, address

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PUNCHING & SHEARING PRESSES.

See our illustrated advertisement on next to last page of this paper.

PEERLESS PUNCH AND SHEAR CO.,
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Machinery, Tools, Engines, &c., For Sale.
Slide Lathes, 12 in. to 7 ft. swing; 4-in. Bement Car-Wheel Borer; 3 Column Drills; large Slotter, 16 in. stroke, 6 ft. table; Suspension Drill; lot of Steel Tools; 50-horse-power Andrews Engine; 20, 30, 40, 50-horse-power Locomotives; 2 to 18-horse-power Up-right Boilers; Vertical Engines, 4 to 12 in. diam. cyl.; Horizontal Engines, 2 to 18 in. diam. cyl.; Steam Pumps, No. 6 to 10; Pulsometers, No. 1 to 7; Siphons, all sizes; Rock Drill and Portable Engine; Hoisting Machinery.
A. G. BROOKS & WINEBRENER,
261 North 3d St., Philadelphia.

Wanted.

A situation as Clerk, Porter, or in any capacity where steady employment could be secured, by a respectable and competent young man. Is thoroughly familiar with the General Hardware business, and can furnish satisfactory references.
Address
Office of The Iron Age, 83 Reade St., N. Y.

To Capitalists and others Seeking
Manufacturing Sites.

The Parnassus, Pa., Industrial Association offers liberal inducements in land and cash to parties who will locate manufacturing establishments in their town. Natural Gas, Coal and Iron Ore in immediate vicinity. Address
FARNASSUS INDUSTRIAL ASSOCIATION,
Parnassus, Westmoreland Co., Pa.

WANTED.—Consentments of small Engines and Boilers, Screw Cutting Foot and Power Lathes, and other desirable tools, at reasonable prices, on commission, by a responsible firm in New York, having a machinery store in first-class location. Address
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1879DQ, 1879DR, 1879DS, 1879DT, 1879DU, 1879DV, 1879DW, 1879DX, 1879DY, 1879DZ, 1879EA, 1879EB, 1879EC, 1879ED, 1879EE, 1879EF, 1879EG, 1879EH, 1879EI, 1879EJ, 1879EK, 1879EL, 1879EM, 1879EN, 1879EO, 1879EP, 1879EQ, 1879ER, 1879ES, 1879ET, 1879EU, 1879EV, 1879EW, 1879EX, 1879EY, 1879EZ, 1879FA, 1879FB, 1879FC, 1879FD, 1879FE, 1879FF, 1879FG, 1879FH, 1879FI, 1879FJ, 1879FK, 1879FL, 1879FM, 1879FN, 1879FO, 1879FP, 1879FQ, 1879FR, 1879FS, 1879FT, 1879FU, 1879FV, 1879FW, 1879FX, 1879FY, 1879FZ, 1879GA, 1879GB, 1879GC, 1879GD, 1879GE, 1879GF, 1879GG, 1879GH, 1879GI, 1879GJ, 1879GK, 1879GL, 1879GM, 1879GN, 1879GO, 1879GP, 1879GQ, 1879GR, 1879GS, 1879GT, 1879GU, 1879GV, 1879GW, 1879GX, 1879GY, 1879GZ, 1879HA, 1879HB, 1879HC, 1879HD, 1879HE, 1879HF, 1879HG, 1879HH, 1879HI, 1879HJ, 1879HK, 1879HL, 1879HM, 1879HN, 1879HO, 1879HP, 1879HQ, 1879HR, 1879HS, 1879HT, 1879HU, 1879HV, 1879HW, 1879HX, 1879HY, 1879HZ, 1879IA, 1879IB, 1879IC, 1879ID, 1879IE, 1879IF, 1879IG, 1879IH, 1879II, 1879IJ, 1879IK, 1879IL, 1879IM, 1879IN, 1879IO, 1879IP, 1879IQ, 1879IR, 1879IS, 1879IT, 1879IU, 1879IV, 1879IW, 1879IX, 1879IY, 1879IZ, 1879JA, 1879JB, 1879JC, 1879JD, 1879JE, 1879JF, 1879JG, 1879JH, 1879JI, 1879JJ, 1879JK, 1879JL, 1879JM, 1879JN, 1879JO, 1879JP, 1879JQ, 1879JR, 1879JS, 1879JT, 1879JU, 1879JV, 1879JW, 1879JX, 1879JY, 1879JZ, 1879KA, 1879KB, 1879KC, 1879KD, 1879KE, 1879KF, 1879KG, 1879KH, 1879KI, 1879KJ, 1879KK, 1879KL, 1879KM, 1879KN, 1879KO, 1879KP, 1879KQ, 1879KR, 1879KS, 1879KT, 1879KU, 1879KV, 1879KW, 1879KX, 1879KY, 1879KZ, 1879LA, 1879LB, 1879LC, 1879LD, 1879LE, 1879LF, 1879LG, 1879LH, 1879LI, 1879LJ, 1879LK, 1879LL, 1879LM, 1879LN, 1879LO, 1879LP, 1879LQ, 1879LR, 1879LS, 1879LT, 1879LU, 1879LV, 1879LW, 1879LX, 1879LY, 1879LZ, 1879MA, 1879MB, 1879MC, 1879MD, 1879ME, 1879MF, 1879MG, 1879MH, 1879MI, 1879MJ, 1879MK, 1879ML, 1879MM, 1879MN, 1879MO, 1879MP, 1879MQ, 1879MR, 1879MS, 1879MT, 1879MU, 1879MV, 1879MW, 1879MX, 1879MY, 1879MZ, 1879NA, 1879NB, 1879NC, 1879ND, 1879NE, 1879NF, 1879NG, 1879NH, 1879NI, 1879NJ, 1879NK, 1879NL, 1879NM, 1879NN, 1879NO, 1879NP, 1879NQ, 1879NR, 1879NS, 1879NT, 1879NU, 1879NV, 1879NW, 1879NX, 1879NY, 1879NZ, 1879OA, 1879OB, 1879OC, 1879OD, 1879OE, 1879OF, 1879OG, 1879OH, 1879OI, 1879OJ, 1879OK, 1879OL, 1879OM, 1879ON, 1879OO, 1879OP, 1879OQ, 1879OR, 1879OS, 1879OT, 1879OU, 1879OV, 1879OW, 1879OX, 1879OY, 1879OZ, 1879PA, 1879PB, 1879PC, 1879PD, 1879PE, 1879PF, 1879PG, 1879PH, 1879PI, 1879PJ, 1879PK, 1879PL, 1879PM, 1879PN, 1879PO, 1879PP, 1879PQ, 1879PR, 1879PS, 1879PT, 1879PU, 1879PV, 1879PW, 1879PX, 1879PY, 1879PZ, 1879QA, 1879QB, 1879QC, 1879QD, 1879QE, 1879QF, 1879QG, 1879QH, 1879QI, 1879QJ, 1879QK, 1879QL, 1879QM, 1879QN, 1879QO, 1879QP, 1879QQ, 1879QR, 1879QS, 1879QT, 1879QU, 1879QV, 1879QW, 1879QX, 1879QY, 1879QZ, 1879RA, 1879RB, 1879RC, 1879RD, 1879RE, 1879RF, 1879RG, 1879RH, 1879RI, 1879RJ, 1879RK, 1879RL, 1879RM, 1879RN, 1879RO, 1879RP, 1879RQ, 1879RR, 1879RS, 1879RT, 1879RU, 1879RV, 1879RW, 1879RX, 1879RY, 1879RZ, 1879SA, 1879SB, 1879SC, 1879SD, 1879SE, 1879SF, 1879SG, 1879SH, 1879SI, 1879SJ, 1879SK, 1879SL, 1879SM, 1879SN, 1879SO, 1879SP, 1879SQ, 1879SR, 1879SS, 1879ST, 1879SU, 1879SV, 1879SW, 1879SX, 1879SY, 1879SZ, 1879TA, 1879TB, 1879TC, 1879TD, 1879TE, 1879TF, 1879TG, 1879TH, 1879TI, 1879TJ, 1879TK, 1879TL, 1879TM, 1879TN, 1879TO, 1879TP, 1879TQ, 1879TR, 1879TS, 1879TT, 1879TU, 1879TV, 1879TW, 1879TX, 1879TY, 1879TZ, 1879UA, 1879UB, 1879UC, 1879UD, 1879UE, 1879UF, 1879UG, 1879UH, 1879UI, 1879UJ, 1879UK, 1879UL, 1879UM, 1879UN, 1879UO, 1879UP, 1879UQ, 1879UR, 1879US, 1879UT, 1879UU, 1879UV, 1879UW, 1879UX, 1879UY, 1879UZ, 1879VA, 1879VB, 1879VC, 1879VD, 1879VE, 1879VF, 1879VG, 1879VH, 1879VI, 1879VJ, 1879VK, 1879VL, 1879VM, 1879VN, 1879VO, 1879VP, 1879VQ, 1879VR, 1879VS, 1879VT, 1879VU, 1879VV, 1879VW, 1879VX, 1879VY, 1879VZ, 1879WA, 1879WB, 1879WC, 1879WD, 1879WE, 1879WF, 1879WG, 1879WH, 1879WI, 1879WJ, 1879WK, 1879WL, 1879WM, 1879WN, 1879WO, 1879WP, 1879WQ, 1879WR, 1879WS, 1879WT, 1879WU, 1879WV, 1879WW, 1879WX, 1879WY, 1879WZ, 1879XA, 1879XB, 1879XC, 1879XD, 1879XE, 1879XF, 1879XG, 1879XH, 1879XI, 1879XJ, 1879XK, 1879XL, 1879XM, 1879XN, 1879XO, 1879XP, 1879XQ, 1879XR, 1879XS, 1879XT, 1879XU, 1879XV, 1879XW, 1879XX, 1879XY, 1879XZ, 1879YA, 1879YB, 1879YC, 1879YD, 1879YE, 1879YF, 1879YG, 1879YH, 1879YI, 1879YJ, 1879YK, 1879YL, 1879YM, 1879YN, 1879YO, 1879YP, 1879YQ, 1879YR, 1879YS, 1879YT, 1879YU, 1879YV, 1879YW, 1879YX, 1879YY, 1879YZ, 1879ZA, 1879ZB, 1879ZC, 1879ZD, 1879ZE, 1879ZF, 1879ZG, 1879ZH, 1879ZI, 1879ZJ, 1879ZK, 1879ZL, 1879ZM, 1879ZN, 1879ZO, 1879ZP, 1879ZQ, 1879ZR, 1879ZS, 1879ZT, 1879ZU, 1879ZV, 1879ZW, 1879ZX, 1879ZY, 1879ZZ.

Manufacturers of and dealers in Cutlery are cautioned against making use of any of said symbols to designate Cutlery, either by putting such marks and numbers on Labels or Invoices, or by stamping the same on manufactured goods.

JOHN RUSSELL CUTLERY CO.

By R. N. OAKMAN, Jr. Treas.
Turners Falls, Mass., March 31, 1880.

For valuable considerations we have licensed the following named companies to use the designating symbols above mentioned:

LANDERS, FRARY & CLARK,
LAMSON & GOODNOW MANUFACTURING CO.,
MERIDEN CUTLERY CO.,
BEAVER FALLS CUTLERY CO.,
AMERICAN CUTLERY CO.

John Russell Cutlery Co.,

By R. N. OAKMAN, Jr., Treas.

TO WHOM IT MAY CONCERN.

The undersigned have adopted the following symbols, viz.: 1878, 1878A, 1878B, 1878C, 1878D, 1878E, 1878F, 1878G, 1878H, 1878I, 1878J, 1878K, 1878L, 1878M, 1878N, 1878O, 1878P, 1878Q, 1878R, 1878S, 1878T, 1878U, 1878V, 1878W, 1878X, 1878Y, 1878Z, 1878AA, 1878AB, 1878AC, 1878AD, 1878AE, 1878AF, 1878AG, 1878AH, 1878AI, 1878AJ, 1878AK, 1878AL, 1878AM, 1878AN, 1878AO, 1878AP, 1878AQ, 1878AR, 1878AS, 1878AT, 1878AU, 1878AV, 1878AW, 1878AX, 1878AY, 1878AZ, 1878BA, 1878BB, 1878BC, 1878BD, 1878BE, 1878BF, 1878BG, 1878BH, 1878BI, 1878BJ, 1878BK, 1878BL, 1878BM, 1878BN, 1878BO, 1878BP, 1878BQ, 1878BR, 1878BS, 1878BT, 1878BU, 1878BV, 1878BW, 1878BX, 1878BY, 1878BZ, 1878CA, 1878CB, 1878CC, 1878CD, 1878CE, 1878CF, 1878CG, 1878CH, 1878CI, 1878CJ, 1878CK, 1878CL, 1878CM, 1878CN, 1878CO, 1878CP, 1878CQ, 1878CR, 1878CS, 1878CT, 1878CU, 1878CV, 1878CW, 1878CX, 1878CY, 1878CZ, 1878DA, 1878DB, 1878DC, 1878DD, 1878DE, 1878DF, 1878DG, 1878DH, 1878DI, 1878DJ, 1878DK, 1878DL, 1878DM, 1878DN, 1878DO, 1878DP, 1878DQ, 1878DR, 1878DS, 1878DT, 1878DU, 1878DV, 1878DW, 1878DX, 1878DY, 1878DZ, 1878EA, 1878EB, 1878EC, 1878ED, 1878EE, 1878EF, 1878EG, 1878EH, 1878EI, 1878EJ, 1878EK, 1878EL, 1878EM, 1878EN, 1878EO, 1878EP, 1878EQ, 1878ER, 1878ES, 1878ET, 1878EU, 1878EV, 1878EW, 1878EX, 1878EY, 1878EZ, 1878FA, 1878FB, 1878FC, 1878FD, 1878FE, 1878FF, 1878FG, 1878FH, 1878FI, 1878FJ, 1878FK, 1878FL, 1878FM, 1878FN, 1878FO, 1878FP, 1878FQ, 1878FR, 1878FS, 1878FT, 1878FU, 1878FV, 1878FW, 1878FX, 1878FY, 1878FZ, 1878GA, 1878GB, 1878GC, 1878GD, 1878GE, 1878GF, 1878GG, 1878GH, 1878GI, 1878GJ, 1878GK, 1878GL, 1878GM, 1878GN, 1878GO, 1878GP, 1878GQ, 1878GR, 1878GS, 1878GT, 1878GU, 1878GV, 1878GW, 1878GX, 1878GY, 1878GZ, 1878HA, 1878HB, 1878HC, 1878HD, 1878HE, 1878HF, 1878HG, 1878HH, 1878HI, 1878HJ, 1878HK, 1878HL, 1878HM, 1878HN, 1878HO, 1878HP, 1878HQ, 1878HR, 1878HS, 1878HT, 1878HU, 1878HV, 1878HW, 1878HX, 1878HY, 1878HZ, 1878IA, 1878IB, 1878IC, 1878ID, 1878IE, 1878IF, 1878IG, 1878IH, 1878II, 1878IJ, 1878IK, 1878IL, 1878IM, 1878IN, 1878IO, 1878IP, 1878IQ, 1878IR, 1878IS, 1878IT, 1878IU, 1878IV, 1878IW, 1878IX, 1878IY, 1878IZ, 1878JA, 1878JB, 1878JC, 1878JD, 1878JE, 1878JF, 1878JG, 1878JH, 1878JI, 1878JJ, 1878JK, 1878JL, 1878JM, 1878JN, 1878JO, 1878JP, 1878JQ, 1878JR, 1878JS, 1878JT, 1878JU, 1878JV, 1878JW, 1878JX, 1878JY, 1878JZ, 1878KA, 1878KB, 1878KC, 1878KD, 1878KE, 1878KF, 1878KG, 1878KH, 1878KI, 1878KJ, 1878KL, 1878KM, 1878KN, 1878KO, 1878KP, 1878KQ, 1878KR, 1878KS, 1878KT, 1878KU, 1878KV, 1878KW, 1878KX, 1878KY, 1878KZ, 1878LA, 1878LB, 1878LC, 1878LD, 1878LE, 1878LF, 1878LG, 1878LH, 1878LI, 1878LJ, 1878LK, 1878LM, 1878LN, 1878LO, 1878LP, 1878LQ, 1878LR, 1878LS, 1878LT, 1878LU, 1878LV, 1878LW, 1878LX, 1878LY, 1878LZ, 1878MA, 1878MB, 1878MC, 1878MD, 1878ME, 1878MF, 1878MG, 1878MH, 1878MI, 1878MJ, 1878MK, 1878ML, 1878MM, 1878MN, 1878MO, 1878MP, 1878MQ, 1878MR, 1878MS, 1878MT, 1878MU, 1878MV, 1878MW, 1878MX, 1878MY, 1878MZ, 1878NA, 1878NB, 1878NC, 1878ND, 1878NE, 1878NF, 1878NG, 1878NH, 1878NI, 1878NJ, 1878NK, 1878NL, 1878NM, 1878NN, 1878NO, 1878NP, 1878NQ, 1878NR, 1878NS, 1878NT, 1878NU, 1878NV, 1878NW, 1878NX, 1878NY, 1878NZ, 1878OA, 1878OB, 1878OC, 1878OD, 1878OE, 1878OF, 1878OG, 1878OH, 1878OI, 1878OJ, 1878OK, 1878OL, 1878OM, 1878ON, 1878OO, 1878OP, 1878OQ, 1878OR, 1878OS, 1878OT, 1878OU, 1878OV, 1878OW, 1878OX, 1878OY, 1878OZ, 1878PA, 1878PB, 1878PC, 1878PD, 1878PE, 1878PF, 1878PG, 1878PH, 1878PI, 1878PJ, 1878PK, 1878PL, 1878PM, 1878PN, 1878PO, 1878PP, 1878PQ, 1878PR, 1878PS, 1878PT, 1878PU, 1878PV, 1878PW, 1878PX, 1878PY, 1878PZ, 1878QA, 1878QB, 1878QC, 1878QD, 1878QE, 1878QF, 1878QG, 1878QH, 1878QI, 1878QJ, 1878QK, 1878QL, 1878QM, 1878QN, 1878QO, 1878QP, 1878QQ, 1878QR, 1878QS, 1878QT, 1878QU, 1878QV, 1878QW, 1878QX, 1878QY, 1878QZ, 1878RA, 1878RB, 1878RC, 1878RD, 1878RE, 1878RF, 1878RG, 1878RH, 1878RI, 1878RJ, 1878RK, 1878RL, 1878RM, 1878RN, 1878RO, 1878RP, 1878RQ, 1878RR, 1878RS, 1878RT, 1878RU, 1878RV, 1878RW, 1878RX, 1878RY, 1878RZ, 1878SA, 1878SB, 1878SC, 1878SD, 1878SE, 1878SF, 1878SG, 1878SH, 1878SI, 1878SJ, 1878SK, 1878SL, 1878SM, 1878SN, 1878SO, 1878SP, 1878SQ, 1878SR, 1878SS, 1878ST, 1878SU, 1878SV, 1878SW, 1878SX, 1878SY, 1878SZ, 1878TA, 1878TB, 1878TC, 1878TD, 1878TE, 1878TF, 1878TG, 1878TH, 1878TI, 1878TJ, 1878TK, 1878TL, 1878TM, 1878TN, 1878TO, 1878TP, 1878TQ, 1878TR, 1878TS, 1878TT, 1878TU, 1878TV, 1878TW, 1878TX, 1878TY, 1878TZ, 1878UA, 1878UB, 1878UC, 1878UD, 1878UE, 1878UF, 1878UG, 1878UH, 1878UI, 1878UJ, 1878UK, 1878UL, 1878UM, 1878UN, 1878UO, 1878UP, 1878UQ, 1878UR, 1878US, 1878UT, 1878UU, 1878UV, 1878UW, 1878UX, 1878UY, 1878UZ, 1878VA, 1878VB, 1878VC, 1878VD, 1878VE, 1878VF, 1878VG, 1878VH, 1878VI, 1878VJ, 1878VK, 1878VL, 1878VM, 1878VN, 1878VO, 1878VP, 1878VQ, 1878VR, 1878VS, 1878VT, 1878VU, 1878VV, 1878VW, 1878VX, 1878VY, 1878VZ, 1878WA, 1878WB, 1878WC, 1878WD, 1878WE, 1878WF, 1878WG, 1878WH, 1878WI, 1878WJ, 1878WK, 1878WL, 1878WM, 1878WN, 1878WO, 1878WP, 1878WQ, 1878WR, 1878WS, 1878WT, 1878WU, 1878WV, 1878WW, 1878WX, 1878WY, 1878WZ, 1878XA, 1878XB, 1

weak and decidedly in buyers' favor. Sales are reported of 700 tons Glengarnock, in lots, at \$28 @ \$29. The bulk of the arrivals since our last writing have been stored, and, unless the demand is greatly stimulated, a large proportion of the iron now afloat will follow the same course. We quote, on the spot, as follows: Glengarnock, \$28 @ \$29; Glengarnock, \$28 @ \$29; Gartsherrie, \$28 @ \$28.50, and Coltness, \$30 @ \$31.

Rails.—Sales are reported of 10,000 tons English Steel Rails at a private price, but we hear that they are offered here at \$70. The steel mills of this country have nothing to offer for early delivery, but for fall and winter shipment orders could probably be placed at \$75 at mill. We quote \$70 @ \$75 for steel. No transactions in iron rails have come to our notice, and we quote them, nominally, \$60 @ \$65.

Old Rails.—The market seems to be at a standstill, so far as old rails are concerned, and quotations are a trifle off from the figures of last week. We quote Ts, \$37, and D. H., \$38.

Scrap.—No new business in scrap is reported, and we quote No. 1 Wrought, from yard, \$38 @ \$40.

Manufactured Iron.—The condition of the market is much the same as it was when we last reported it. Bars may be quoted weak at 3.8¢, and the visible supply, especially of foreign iron, is steadily increasing. A meeting of the Western Iron Association has been called by telegraph for Thursday morning, 8th inst., at 10 o'clock. The probable result of this meeting will be a reduction of the card on iron to 3½¢, if not lower. It is the impression among the best informed of Western ironmasters that the demand for the year will be no less than they have calculated upon. The agricultural implement manufacturers are bare of manufactured stock and material, and the demand from this class, which is always so large a part of the business of the Western iron mills, will be larger than ever. There is no poverty in the country. Everybody is at work; improvements are going on, and there is every sign of present and continued prosperity, but while there is so much iron in the hands of jobbers and speculators that was bought at 3½¢ or less, they realize the need of putting the card down to meet these stocks, and we should not be surprised to see iron even lower than 3½¢. It will be put lower if it is necessary to do it to get down to a price that will meet this low-priced iron. When this is done there will be some hope of an improvement.

METALS.

Copper.—The market here has been very quiet, sales of Lake Superior being limited to 100,000 lb. at 22¢, which is nominally the closing figure also for Baltimore. There is nothing of interest per cable from London, the market being unaltered, nor anything from the West Coast—no events of importance being reported. Our Spanish exchanges, on the other hand, are interesting. The *Cronica de la Industria*, of Madrid, March 15, contains the foreign trade movement in Spain, in 1879, as compared with that of 1878. Both the quantities and values are given, and so far as metals are concerned, these official statistics should command the most serious attention at the hands of the metal trade, especially as regards Copper, Lead, Zinc and Quicksilver. Although the bulk of the capital invested in Spain in mining and smelting is English, the London metal statisticians seem to ignore—either purposely or through inadvertence—what is going on in these metals in the Peninsula, and yet they must be aware that Spain is the greatest European producer of all but Spelter, there being no country on the face of the earth so rich in base metals as Spain. Copper has been exported from there:

| | 1879. | Francs. | Tons. | Francs. |
|-----------------|---------|------------|--------|------------|
| Copper in Bars. | 20,814 | 17,420,425 | 1,377 | 1,078,431 |
| Copper Ore. | 450,576 | 34,162,053 | 47,750 | 39,295,437 |

While, therefore, the export of pyrites shows an increase of more than 30,000 tons, Copper in bars shows an excess of nearly 20,000 tons in a single year. In Chile they are fully aware of this enormous increase in Copper production in Spain, for the *Ferricarril*, of Santiago, of Feb. 21, estimates the same for 1879 at 25,000 tons. One thing is certain, i. e., that the monthly London-Havre Copper statistics are henceforth incomplete, for they take no notice of the stock at Marseilles, which notoriously receives from Spain large amounts of Copper direct. Incomplete statistics are vicious, for they are calculated to mislead merchants, producers and manufacturers, instead of assisting and guiding them in their operations; we therefore hope and trust that the English and French monthly Copper statistics may in future also contain the amounts at Marseilles; if they do not embrace these they cease to be valuable. As for the influence of the exuberant Copper production of Spain, so far as values are concerned, this is another problem which will have to be taken into account in the future. It is hardly to be expected that Spain will again increase 20,000 tons this year, but it may possibly increase 10,000 tons, and should this be the case and the Peninsula turn out in 1880 30,000 tons, it is easy to foresee that such an accession to the supply could hardly fail to affect the price, unless consumption made extraordinary headway in the meantime. We expatiate upon this subject merely for the purpose of showing that Spanish production may be destined to play a more prominent part in the near future than the trade papers of the north of Europe have hitherto led us to suppose. There has been no change in the manufactures of Copper here since our last report. We quote: Braziers' Copper,

34¢; Bolts, 34¢; Circles, 37¢, and Sheathing Copper, 32¢.

Tin.—The Dutch sale went off on March 31 at 51.25 guilders the 50 kilos, equal to \$86 in London, against 42 guilders, or £71, in March, 1879. Shipments from the Straits to the United States in March were 500 tons, but England bought nothing. English merchants are evidently shy of the metal at ruling rates; in spite of the probable reduction in the visible supply in England, London does not advance, the fluctuations during the week being between £85 and £88. Besides the ordinary jobbing demand here, about 200 tons Straits were bought by a speculator at 20½¢, but the regular metal firms keep aloof from buying for reasons best known to themselves. The metal trade perceives with dismay the enormous supplies rushing in upon us from all quarters; a serious break in prices everywhere is, consequently, apprehended, causing legitimate consumption to restrict its purchases to the strictly necessary. According to Messrs. Gillfillan, Wood & Co.'s Singapore report of February 24, Straits Tin at the time stood \$30.75 per picul; it is now wired \$27.50. Imports here continue on an extensive scale, having been 13,500 slabs Straits during the week. At the close it is reported that 100 tons Straits were sold on the spot yesterday, at 20½¢, and Singapore cables \$28, while London quotes Straits, £88. The market winds up with greater steadiness, influenced by some spring demand, which begins to manifest itself. We quote Straits, 20½¢ @ 21½¢, large lines; Australian, 21¢; Billiton, 20½¢ @ 20½¢; English Refined, 20½¢; do. Common, 20¢ @ 20½¢, and Banca, 23½¢ @ 24¢. **Tin Plates.**—To-morrow's quarterly meeting of makers in Wales is looked for with considerable interest, pending which the market here has relaxed into a quiet state, although the jobbing trade has continued to be satisfactory. Holders remain firm, but consumers do not show much anxiety to operate, in consequence of which prices are rather heavy, and the ensuing quotations have to be put down as nominal. We quote at the close, large lots, ordinary brands, per box: Charcoal Bright, \$9.25; ditto Ternes, \$7.75 @ \$8.25; Coke Tins, \$6.62½ @ \$6.75, and ditto Ternes, \$6.75 @ \$7.

Lead.—With the opening of the spring trade a good deal more inquiry has developed, leading to sales during the week of some 500 tons Common, of which 300 tons Newark at 5½¢, net cash, and 500 tons Refined at 6¢, leaving the quotation of the latter 6¢ @ 6½¢ at the close. Manufacturers of Lead remain unchanged. We quote: Sheet Lead, 9¢; Pipe, 8½¢; Tin-lined Lead Pipe, 15¢, and Block-Tin Pipe, 45¢, less the usual discount to dealers. Spanish export was last year 100,336 tons Pig Lead, against 90,842 tons in 1878, an increase of 9,494 tons. Since the elections England is slightly looking up.

Spelter and Zinc.—There has been a better demand and more doing at the concessions made, 150 tons Silesian selling at 6½¢, while Common Domestic is worth 6¼¢. Accounts from the other side per cable are a little better. The export of Calamine from Spain was only 27,613 tons last year, against 33,533 tons in 1878. Sheet Zinc is quiet here at 8¢ @ 8½¢.

Nickel.—No further change has taken place; the demand is moderately active at \$1.50 for prime American.

Antimony.—Stocks in England have run very low; the absence of Cookson's brand causes a greater consumption of Hallett's and Johnson's. There is no Cookson here, but Johnson sells at 18½¢ @ 18¾¢, and Hallett at 20¢.

COAL.

On Monday of this week the mines began to work full time, and a full supply of Coal was expected. In spite of this fact and the needs of the manufacturers, the trade does not seem to be as well sustained as was expected. The demand, which was good when production was curtailed by one-half, does not make so much show in the face of a full tonnage. Customers, too, are not as eager for Coal now as they were when there was greater difficulty in getting it. There is, in fact, a perceptible waiting for lower prices on the part of consumers, who say, "We will wait till there is larger stock in the market." On the other hand, the companies say they do not intend to put Coal on the market this year at a loss. They point to the fact that they are in harmony, and have given up the cut-throat policy, and intend in the future to suspend operations whenever the quantity of Coal produced is more than the market requires. "The circular rates are well sustained, with the usual commission of 10 or 15 cents," is the report which dealers give. This may be taken as another way of saying that the circular rates are shaded to the extent of at least 10 or 15 cents. We hear reports that there are dealers who are working off "small" lots of Coal at considerably less than the market rates. Stove and Chestnut are still very dull. Freighters are unchanged and vessels are abundant. Since the river opened, we have Troy quoted at 40 cents. Quotations—Hard White Ash, Lump and Steam, \$5; Broken, \$4 @ \$4.25; Egg, \$4.25; Stove and Chestnut, \$4. The free burning Coals range from \$3.90 @ \$4 for Lump, and \$3.50 @ \$4 for Grate and Egg. Stove and Chestnut are quoted at from \$3.90 @ \$4.

OLD METALS, PAPER STOCK, &c.

We have no change to report in these markets from the dullness noted in our last issue.

The purchasing prices offered by dealers for Old Metals are as follows:

| | | | | |
|-------------------------|---------|--------|---|-------|
| Copper, heavy..... | per lb. | \$0.10 | @ | 10 |
| Copper Bottoms..... | " | 10 | @ | 10 |
| Yellow Metal..... | " | 10 | @ | 10 |
| Brass, heavy..... | " | 10 | @ | 10 |
| Brass, light..... | " | 10 | @ | 10 |
| Composition, heavy..... | " | 10 | @ | 10 |
| Lead, heavy..... | " | 10 | @ | 10 |
| Tea Lead..... | " | 10 | @ | 10 |
| Zinc..... | " | 10 | @ | 10 |
| Pewter, No. 1..... | " | 10 | @ | 10 |
| Pewter, No. 2..... | " | 10 | @ | 10 |
| Wrought Iron..... | per ton | 35.00 | @ | 35.00 |
| Light do..... | " | 30.00 | @ | 30.00 |
| Stove Plate..... | " | 15.00 | @ | 15.00 |

Machinery do..... 20.00 @ 22.50
Grate Bars..... 10.00 @ 12.50

The prices current for Rags &c., are as follows:

| | | | | |
|-----------------------------|---------|-----|---|---|
| Canvas, Linen..... | per lb. | 4½¢ | @ | 5 |
| White Cotton, New..... | " | 4½¢ | @ | 5 |
| No. 2..... | " | 3 | @ | 5 |
| No. 3..... | " | 3 | @ | 5 |
| Second..... | " | 2½¢ | @ | 5 |
| Soft, Woollens..... | " | 15 | @ | 5 |
| Mixed Rags..... | " | 2 | @ | 5 |
| Gunny bagging..... | " | 2 | @ | 5 |
| Butter,..... | " | 2½¢ | @ | 5 |
| Kentucky bagging..... | " | 2 | @ | 5 |
| Book Stock..... | " | 2 | @ | 5 |
| Newspapers..... | " | 2½¢ | @ | 5 |
| Waste Paper and Scraps..... | " | 1 | @ | 5 |
| Kentucky Bale Rope..... | " | 4 | @ | 5 |

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending April 6, 1880:

| Hardware. | Perkins, Livingstone & Co. |
|------------------------|----------------------------|
| Barbour Bros. | Spiegel iron, tons, 302 |
| Machinery, case, 1 | Phelps, Dodge & Co. |
| Baring Bros. & Co. | Phelps, Dodge & Co. |
| Wire, cs., 808 | Phelps, Dodge & Co. |
| Hdw., cs., 2 | Phelps, Dodge & Co. |
| Baker, Hermann & Co. | Phelps, Dodge & Co. |
| Cutlery, hdw. and | Phelps, Dodge & Co. |
| guns, cs., 39 | Phelps, Dodge & Co. |
| Cutlery, hdw. and | Phelps, Dodge & Co. |
| guns, cs., 17 | Phelps, Dodge & Co. |
| Brown Bros. & Co. | Phelps, Dodge & Co. |
| Lawn mowers, cs., | Phelps, Dodge & Co. |
| 22 | Phelps, Dodge & Co. |
| Brown J. B. | Phelps, Dodge & Co. |
| Hdw., box, 1 | Phelps, Dodge & Co. |
| Brown Wm. | Phelps, Dodge & Co. |
| Grindstones, 50 | Phelps, Dodge & Co. |
| Buchanan & Lyall, | Phelps, Dodge & Co. |
| Machinery, cs., 2 | Phelps, Dodge & Co. |
| Carey S. | Phelps, Dodge & Co. |
| Grindstones, cs., 14 | Phelps, Dodge & Co. |
| Carey & Moen, | Phelps, Dodge & Co. |
| Steel wire, bbls., 224 | Phelps, Dodge & Co. |
| Charles R. P. | Phelps, Dodge & Co. |
| Grindstones, 940 | Phelps, Dodge & Co. |
| Cutlery, cs., 2 | Phelps, Dodge & Co. |
| Davies & Co. | Phelps, Dodge & Co. |
| Hdw., cs., 7 | Phelps, Dodge & Co. |
| Field, Alfred & Co. | Phelps, Dodge & Co. |
| Chains, cs., 11 | Phelps, Dodge & Co. |
| Hdw., cs., 4 | Phelps, Dodge & Co. |
| Per caps, cs., 2 | Phelps, Dodge & Co. |
| Cutlery, cs., 1 | Phelps, Dodge & Co. |
| Folsom H. D. | Phelps, Dodge & Co. |
| Arms, case, 1 | Phelps, Dodge & Co. |
| Friedmann & Lauter- | Phelps, Dodge & Co. |
| jung | Phelps, Dodge & Co. |
| Mdse., pgs., 4 | Phelps, Dodge & Co. |
| Graef Cutlery Co. | Phelps, Dodge & Co. |
| Mdse., pgs., 16 | Phelps, Dodge & Co. |
| Grimm H. B. | Phelps, Dodge & Co. |
| Scythe stones, bxs., | Phelps, Dodge & Co. |
| 1 | Phelps, Dodge & Co. |
| Hartley & Graham, | Phelps, Dodge & Co. |
| Mdse., pgs., 8 | Phelps, Dodge & Co. |
| Arms, cs., 19 | Phelps, Dodge & Co. |
| Julius A. D. & Co. | Phelps, Dodge & Co. |
| Machinery, cs., 26 | Phelps, Dodge & Co. |
| Lamarche H. | Phelps, Dodge & Co. |
| Arms, cs., 11 | Phelps, Dodge & Co. |
| Livingstone, W. & F. | Phelps, Dodge & Co. |
| Grindstones, 137 | Phelps, Dodge & Co. |
| Lockwood A. J. | Phelps, Dodge & Co. |
| Files, cs., 2 | Phelps, Dodge & Co. |
| McGoy & Co. | Phelps, Dodge & Co. |
| Hdw., cs., 2 | Phelps, Dodge & Co. |
| Cutlery, cs., 2 | Phelps, Dodge & Co. |
| Montgomery J. M. | Phelps, Dodge & Co. |
| Steel wire, cs., 6 | Phelps, Dodge & Co. |
| Moore's J. P. Sons, | Phelps, Dodge & Co. |
| Arms, cs., 11 | Phelps, Dodge & Co. |
| Patrick & Carter, | Phelps, Dodge & Co. |
| Tel. cable, drums, 7 | Phelps, Dodge & Co. |
| Phelps, Dodge & Co. | Phelps, Dodge & Co. |
| Wire, bbls., 553 | Phelps, Dodge & Co. |
| Steel wire, bbls., 44 | Phelps, Dodge & Co. |
| Pierson & Co. | Phelps, Dodge & Co. |
| Wire, bbls., 513 | Phelps, Dodge & Co. |
| Rogers H. | Phelps, Dodge & Co. |
| Mdse., pgs., 1 | Phelps, Dodge & Co. |
| Schoverling, Daly & | Phelps, Dodge & Co. |
| Mdse., pgs., 1 | Phelps, Dodge & Co. |
| Hdw., cs., 11 | Phelps, Dodge & Co. |
| Shipper R. L. | Phelps, Dodge & Co. |
| Wire rods, cs., 17 | Phelps, Dodge & Co. |
| Straus & Sons, | Phelps, Dodge & Co. |
| Cutlery, cs., 1 | Phelps, Dodge & Co. |
| Struller, Lau & Co. | Phelps, Dodge & Co. |
| Mdse., pgs., 1 | Phelps, Dodge & Co. |
| Taylor Thos. | Phelps, Dodge & Co. |
| Hdw., cs., 2 | Phelps, Dodge & Co. |
| Ter Kule J. | Phelps, Dodge & Co. |
| Whetstones, case, 1 | Phelps, Dodge & Co. |
| Tillson, G. & Co. | Phelps, Dodge & Co. |
| Wire, bbls., 275 | Phelps, Dodge & Co. |
| Wallach A. E. | Phelps, Dodge & Co. |
| Hdw., pgs., 2 | Phelps, Dodge & Co. |
| White J. S. | Phelps, Dodge & Co. |
| Machinery, case, 1 | Phelps, Dodge & Co. |
| Wiebush & Hilger | Phelps, Dodge & Co. |
| Hdw., cs. | Phelps, Dodge & Co. |
| Cutlery, hardware, | Phelps, Dodge & Co. |
| and vices, | Phelps, Dodge & Co. |
| pgs., 523 | Phelps, Dodge & Co. |
| Winchester Repeating | Phelps, Dodge & Co. |
| Arms Co. | Phelps, Dodge & Co. |
| Bas & Co. | Phelps, Dodge & Co. |
| Mdse., pgs., 1 | Phelps, Dodge & Co. |
| Witte J. G. & Bro. | Phelps, Dodge & Co. |
| Mdse., pgs., 2 | Phelps, Dodge & Co. |
| Wolf, G. & Co. | Phelps, Dodge & Co. |
| Wire, bbls., 4537 | Phelps, Dodge & Co. |
| Wire, bbls., 2557 | Phelps, Dodge & Co. |
| Steel wire, pgs., 545 | Phelps, Dodge & Co. |
| Order. | Phelps, Dodge & Co. |
| Arms, cs., 64 | Phelps, Dodge & Co. |
| Coal, cs., 2 | Phelps, Dodge & Co. |
| Gun caps, cs., 5 | Phelps, Dodge & Co. |

| Iron. | Perkins, Livingstone & Co. |
|------------------------|----------------------------|
| Old iron, tons, 40 | Phelps, Dodge & Co. |
| Baring Bros. & Co. | Phelps, Dodge & Co. |
| Pig, tons, 1392 | Phelps, Dodge & Co. |
| Old iron, tons, 225 | Phelps, Dodge & Co. |
| Bars, 12,958 | Phelps, Dodge & Co. |
| Bundles, 1195 | Phelps, Dodge & Co. |
| Wire rods, bbls., 2249 | Phelps, Dodge & Co. |
| Wire rods, bbls., 950 | Phelps, Dodge & Co. |
| Coils, 881 | Phelps, Dodge & Co. |
| Bowling & Archibald, | Phelps, Dodge & Co. |
| Old anchors, 6 | Phelps, Dodge & Co. |
| Old iron, tons, 53½ | Phelps, Dodge & Co. |
| Brown Bros. & Co. | Phelps, Dodge & Co. |
| Bars, 1682 | Phelps, Dodge & Co. |
| Byrne Jos. & Co. | Phelps, Dodge & Co. |
| Bundles, 301 | Phelps, Dodge & Co. |
| Canadian Bank of Com- | Phelps, Dodge & Co. |
| merce, | Phelps, Dodge & Co. |
| Bars, 2024 | Phelps, Dodge & Co. |
| Carpenter J. C. | Phelps, Dodge & Co. |
| Bars, 470 | Phelps, Dodge & Co. |
| Crowell & Co. | Phelps, Dodge & Co. |
| Bar iron, bbls., 513 | Phelps, Dodge & Co. |
| Halters, 384 | Phelps, Dodge & Co. |
| Pig, tons, 520 | Phelps, Dodge & Co. |
| Half-ass, Field & Co. | Phelps, Dodge & Co. |
| Bars, 600 | Phelps, Dodge & Co. |
| Jansen J. A. | Phelps, Dodge & Co. |
| Bars, 55,795 | Phelps, Dodge & Co. |
| Lundberg G. | Phelps, Dodge & Co. |
| Bars, 1431 | Phelps, Dodge & Co. |
| Marcel Wm. D. | Phelps, Dodge & Co. |
| Ore, tons, 28½ | Phelps, Dodge & Co. |
| Mersick, C. G. & Co. | Phelps, Dodge & Co. |
| Bar iron, bbls., 240 | Phelps, Dodge & Co. |
| Milliken & Smith, 6 | Phelps, Dodge & Co. |
| Wire rods, bbls., 1295 | Phelps, Dodge & Co. |
| Montell F. T. & Son, | Phelps, Dodge & Co. |
| Old iron, tons, 6½ | Phelps, Dodge & Co. |
| Morton, Bliss & Co. | Phelps, Dodge & Co. |
| Rails, 2200 | Phelps, Dodge & Co. |
| Moses & Cohen, | Phelps, Dodge & Co. |
| Old iron, cs., 1 | Phelps, Dodge & Co. |
| Old iron, pcs., 15 | Phelps, Dodge & Co. |
| Nevada Bank, | Phelps, Dodge & Co. |
| Tons, 100 | Phelps, Dodge & Co. |
| Ogden & Wallace, | Phelps, Dodge & Co. |
| Hoop iron, bbls., | Phelps, Dodge & Co. |
| 2226 | Phelps, Dodge & Co. |

| Steel. | Perkins, Livingstone & Co. |
|-------------------------|----------------------------|
| Baring Bros. & Co. | Phelps, Dodge & Co. |
| Bundles, 1482 | Phelps, Dodge & Co. |
| Blake Bros. & Co. | Phelps, Dodge & Co. |
| Bundles, 430 | Phelps, Dodge & Co. |
| Brown Wm. | Phelps, Dodge & Co. |
| Cases, 17 | Phelps, Dodge & Co. |
| Packers, 384 | Phelps, Dodge & Co. |
| Cary & Moen, | Phelps, Dodge & Co. |
| Steel wire rods, bbls., | Phelps, Dodge & Co. |
| 409 | Phelps, Dodge & Co. |
| Lockwood A. J. | Phelps, Dodge & Co. |
| Bars, 35 | Phelps, Dodge & Co. |
| Bundles, 128 | Phelps, Dodge & Co. |
| Prosser Thos. & Son, | Phelps, Dodge & Co. |
| Packers, 149 | Phelps, Dodge & Co. |
| Bundles, 90 | Phelps, Dodge & Co. |
| Scott Thos. | Phelps, Dodge & Co. |
| Bundles, 50 | Phelps, Dodge & Co. |
| Thomson Spring Co. | Phelps, Dodge & Co. |
| Bundles, 255 | Phelps, Dodge & Co. |
| Woodford, W. O. | Phelps, Dodge & Co. |
| Bars, 126 | Phelps, Dodge & Co. |
| Bundles 295 | Phelps, Dodge & Co. |
| Cs., 28, 14 | Phelps, Dodge & Co. |
| Order. | Phelps, Dodge & Co. |
| Bars, 5342 | Phelps, Dodge & Co. |
| Bundles, 406 | Phelps, Dodge & Co. |
| Cases, 17 | Phelps, Dodge & Co. |
| Casks, 27 | Phelps, Dodge & Co. |
| Rails, 1656 | Phelps, Dodge & Co. |
| Steel axles, 2 | Phelps, Dodge & Co. |

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending April 6, 1880:

| Hamburg. | Quanz. Val. | Venezuela. | Quanz. Val. |
|-----------------------|-------------|----------------------|-------------|
| Hdw., cs., 72 | \$2,234 | Hdw., cs., 61 | \$1,460 |
| Ag. imp., pgs., 198 | 7,248 | Sew. mach., cs., 35 | 1,040 |
| Pldware, cs., 4 | 454 | Mf. iron, pgs., 5 | 83 |
| Belting, cs., 5 | 1,484 | Nails, cs., 5 | 145 |
| Mf. iron, pgs., 31 | 320 | Nails, kegs., 58 | 393 |
| Mach'y, cs., 29 | 3,010 | Pumps, pgs., 2 | 1,827 |
| Sew. ma., cs., 50 | 2,144 | Ptms., gals., 14,617 | 1,827 |
| Ptms., gals., 261,045 | 21,535 | Cartridges, cs., 10 | 107 |
| | | Powder, lbs., 1,450 | 351 |
| | | Glassware, cs., 19 | 162 |
| | | Revolvers, cs., 8 | 258 |
| | | Tinware, cs., 9 | 350 |
| | | Mach'y, pgs., 41 | 1,434 |
| | | Insulators, cs., 20 | 412 |
| Bremen. | Quanz. Val. | Porto Rico. | Quanz. Val. |
| Lub. oil, gals., 7302 | 2,181 | Ptms., gals., 4,000 | 460 |
| Ag. imp., pgs., 8 | 625 | Hoops, bbls., 373 | 141 |
| Lea, beltg., cs., 1 | 440 | | |
| S. shanks, cs., 3 | 102 | | |
| Ag. imp., pgs., 441 | 10,202 | | |
| Ptms., gals., 156,448 | 91,551 | | |
| Lub. oil, pgs., 83 | 475 | | |
| Hdw., cs., 24 | 685 | | |
| Cronstadt. | Quanz. Val. | Havt. | Quanz. Val. |

THE QUARTERLY MEETINGS, which will be held at Middlesbrough on April 9, Wolverhampton April 7, and Birmingham on April 8, are now so nigh at hand that there is beginning to be the usual speculation as to the probable action of the ironmasters thereat. There is very little difference of opinion as to the impolicy of declaring further advances in prices at present, but there is the fear that the incidence of the wages sliding scale, in point of the influence exerted by the prices of the past quarter, will be made the excuse for additional increments by some of the manufacturers of finished iron. The present list quotation for marked Staffordshire bars is, as you are aware, £9, which is only being secured at the moment with great difficulty; indeed, I hear it stated that less money is not only accepted, but acceptable, in some quarters. I have little or no hesitation in saying that, at £9 for bars, there is a good profit for the manufacturers, the majority of the "list" houses having their own coal, ore, limestone, &c. That being the case, and he wants of consumers being unmistakably

and considerably small and below the production, I fail to see the most remote reason for warranting another rise. I am neither a maker, user, vender nor buyer of iron, so that I claim to be disinterested in my motives. That being the case, I should certainly deem a rise in bars at the quarterly meetings absolutely unjustifiable and as a "try on" quite unworthy of those who, instead of the indirect promoters of speculation and unhealthy inflation, ought to endeavor by every possible means in their power to keep the trade on a secure, sound and legitimate basis. It is quite within the power of half-a-dozen houses (at the most) to do this, and as in that number there are included Lord Dudley, William Barrows & Son, Robert Leath & Sons, Philip Williams, &c., the result ought not to be, but is, doubtful. One influential gentleman is understood to clamor for at least 10/ more at or just before quarter day, and there is the chance—perhaps a stronger word would fit better—that his views will prevail.

SCOTCH PIG IRON

has been irregularly dull throughout the week, notwithstanding the existence of data which had led some persons to form the opinion that something of a recovery would not have been unlikely toward the end of last week. In point of reserve stocks the returns are better, the stock held by Connal & Co. to-day being 441,041 tons, as against 229,799 tons last year. During the week the quantity held has decreased to the extent of 2356 tons, but, as I mentioned last week, this may have been caused by makers' abstention from sending iron into store, preferably keeping it within their own premises. Shipments last week are shown by John E. Swan & Bro.'s circular to have been 20,985 tons (16,612 tons to foreign ports), an increase of 10,743 tons over the total for the corresponding week of 1879. The total growth of shipments to date has been 56,332 tons, on a total this year of 145,561 tons. Most of the additional tonnage has gone to foreign destinations, but more also has been sent coastwise, which would seem to indicate that English consumers are manifesting a renewed preference for Scotch brands. The imports from Middlesboro' into Grangemouth last week declined to the unprecedentedly small total of 660 tons, a decrease of 4420 tons from the same week of last year. This drop leaves the net increase for 1880, in this respect, 1774 tons only. Ballast pig is still held at 57/6 @ 60/, delivered alongside. Writing from Glasgow, March 2, John E. Swan & Bro., Limited, give the following quotations:

| | No. 1. | No. 2. | No. 3. | No. 4. |
|-----------------------|--------|--------|--------|--------|
| Gartsherrie..... | 57/6 | 60/ | 60/ | 60/ |
| Coltness..... | 57/6 | 60/ | 60/ | 60/ |
| Langloan..... | 57/6 | 60/ | 60/ | 60/ |
| Shotts, Ordinary..... | 57/6 | 60/ | 60/ | 60/ |
| Older..... | 57/6 | 60/ | 60/ | 60/ |
| Summerlee..... | 57/6 | 60/ | 60/ | 60/ |
| Chapelhall..... | 57/6 | 60/ | 60/ | 60/ |
| Carnbroe..... | 57/6 | 60/ | 60/ | 60/ |
| Clyde..... | 57/6 | 60/ | 60/ | 60/ |
| Quarter-Clyde..... | 57/6 | 60/ | 60/ | 60/ |
| Govan..... | 57/6 | 60/ | 60/ | 60/ |
| Monkland..... | 57/6 | 60/ | 60/ | 60/ |
| Glengarnock..... | 57/6 | 60/ | 60/ | 60/ |
| Ardeer..... | 57/6 | 60/ | 60/ | 60/ |
| Eglington..... | 57/6 | 60/ | 60/ | 60/ |
| Lugar..... | 57/6 | 60/ | 60/ | 60/ |
| Murkirk..... | 57/6 | 60/ | 60/ | 60/ |
| Portland..... | 57/6 | 60/ | 60/ | 60/ |
| Dalmellington..... | 57/6 | 60/ | 60/ | 60/ |
| Carron, Selected..... | 57/6 | 60/ | 60/ | 60/ |
| Carron, Ordinary..... | 57/6 | 60/ | 60/ | 60/ |
| Almond, Export..... | 57/6 | 60/ | 60/ | 60/ |
| Almond, Home use..... | 57/6 | 60/ | 60/ | 60/ |
| Kinnell..... | 57/6 | 60/ | 60/ | 60/ |

CLEVELAND PIG IRON

is rather weaker in a general sense, and is now held at the appended figures, all net cash, for G. M. B., f. o. b. in Tees:

| No. 1 Foundry..... | No. 2 Foundry..... | No. 3 Foundry..... | No. 4 Foundry..... |
|--------------------|--------------------|--------------------|--------------------|
| 62/6 | 62/6 | 62/6 | 62/6 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |

At these prices the trade seems to be on a sound basis, notwithstanding the smallness of the current shipments from Middlesboro' into Scotland. Last week's exports from the Tees included 1700 tons of steel blooms to Philadelphia. These, I believe, were shipped by Bolckow, Vaughan & Co., who are among those who display the nicest appreciation of the wants of your market. There went also a cargo of pig to New York. Other American orders are said to be on hand unexecuted, chiefly by Bolckow, Vaughan, Bell Bros. and W. Whitwell & Co. At Eaton the new Thomas-Gilchrist plant is being pushed forward and will shortly be ready for use, when we shall see what we shall see.

FROM SHEFFIELD

I hear somewhat varying accounts, especially from those who are engaged in the lighter industries. The cutlery manufacturers appear to be doing less work in several quarters, the only houses which are at all active being those (such as Rodgers, Harrison Bros., George Wostenholms, Brookes & Crookes, and a few others) who cultivate special markets or departments. The general cutlery are not at all busy, nor do I gather that much is being done by the electroplaters and certain other manufacturers of light articles. In the steel cutlery lines somewhat of a controversy has arisen on the subject of the use or non-use of Bessemer steel for the blades. A correspondent of the *Ironmonger* made the assertion, on the strength of an informant in the trade, that "50 per cent. of the cutlery now made in Sheffield is of Bessemer steel." This statement was, no doubt, rather too strong as it stood, and some discrimination should have been used as to the class of cutlery called in question. The matter does not appear to have been noticed for a time, but at length more or less indignant contradictions have appeared. One gentleman, however, Mr. W. Allen (who is, I believe, brother-in-law of Sir Henry Bessemer and manager of the company which bears his name at Sheffield), has since written to a local journal, declaring that although the *Ironmonger's* correspondent was, no doubt, wrong as to the precise percentage, yet that a very large quantity of Bessemer material is being so used, and not for cutlery alone, but for hundreds of other purposes. The *Ironmonger* seems to treat the matter as a mere quibble, not altogether free from a ludicrous tinge, but broadly maintains that Bessemer steel not only has been, but is being very largely

made use of for cutlery purposes. Of this fact, I presume, there can be no doubt. Anybody who has been much among the steel works, and knows anything of the "inner runs" of the business, must be well aware that of late years the smaller houses making files, saws, cutlery of all sorts, tools, &c., have exhibited a real fondness for "Bessemer," which they have had rolled down from the "sawn middles" of rail ends, or treated in the usual way from the ingots. I don't say this is wrong, indeed I should assume that good Bessemer is quite good enough for all common pocket and table cutlery, but I quite concur in the views of those who think it is not sufficiently good or reliable for good pen, or table knives, or for files and saws. It is asserted, and I believe with truth, that none of the best-known Sheffield houses use Bessemer for cutlery, but confine themselves entirely to cast steel. That all the principal firms use cast steel I can avow from my own knowledge. Among the gossip of the day at Sheffield is the rather old item, hashed up by a local "liner," that Mr. Mark Firth has acquired the "Leufsta" hoop L brand of Swedish iron, so long monopolized by William Jessop & Sons. There is nothing particularly new in this announcement, because those who know anything of the trade are well aware that Mr. Firth has bought this brand for three years past. I happen to know that Mr. Firth holds £80,000 of £100,000 worth of Swedish iron at the present time, and that he is still buying—at all events he is understood to have secured several thousand pounds worth within the past 10 days. In the 1871-3 period, Mr. Firth made very heavy profits out of Swedish iron, which he had been shrewd enough to buy well forward in the hope of a rise. The firm in Sweden with whom he had the contract for supplies wished to get out of their bargain when the price by rapid jumps had gone up from about £6 for pig to £15 and £16, and bars in proportion, and they finally paid a large sum (£20,000 was stated) to be clear of the transaction. Even at that price they made money. So did Mr. Firth. That gentleman has many advantages over ordinary buyers of foreign iron. Being a steel converter himself, he is always insured against positive loss provided he buys pretty well, and in case of rapid rises he is certain to make large profits in realizing in the open market among other steel converters.

THE COMPANIES' REPORTS.

which have become known within the past week or so, are not all tinted *coulour de rose*, although one or two do afford faint indications of that pleasant hue. Charles Cammell & Co., Limited, Sheffield, announce that the accounts for the year ending December 31, 1879, show £62,405 (including a balance of £17,389 brought forward from 1878) available for a dividend of 5 per cent., which will absorb £40,000 and leave a balance of £22,405 to be carried forward. This concern is most ably and capably managed by Mr. George Wilson, hence it is not surprising to find that the accounts come out better than those of some other local companies. This remark does not apply to Brown, Bayley & Dixon, Limited, which, under the gallant and sagacious conduct of Mr. Holland, has made great strides and will sooner or later take its true position as one of the best of similar concerns. For 1879 the loss on working has been £10,000, but the directors report that the improvement in trade is being beneficially felt by the company, every department of the works being in full operation. The Patent Shaft and Axletree Company, Birmingham, are allotting £60,000 5-per-cent. debentures, and the capital of the Chatterley Iron Company, Staffordshire, is to be increased by an issue of £125,000 preference shares of £25 each. The Monkland Iron and Coal Company show a loss of £3887 on the year's operations, after writing off £10,000 for depreciation. The Darlington Iron Company have made a net profit of £431, which reduces the debit side of their profit-and-loss account to £19,908. A Bessemer plant has been erected and the works are fully engaged. The annual report of William Jessop & Sons, Limited, Sheffield, is as follows:

"After paying interest on mortgage loans, &c., there remains a net balance of £17,960, from which it is proposed to deduct £600 in reduction of the formation expenses, and £4000 for depreciation on machinery and buildings, and to declare a dividend of 30/ per share, amounting to £11,530. 10/ being at the rate of 5 per cent. for the year on the called-up capital, leaving a balance of £130. 3/7 to be carried forward to the next account. The stocks of steel at the New York and Boston depots have been verified by Mr. W. H. Weed, of New York. There having been a marked improvement in the demand for the company's manufactures during the last few months, your directors have determined to reopen the Park Works and the Soho Rolling Mill, and these premises have been placed in working order at a small expenditure. In accordance with the articles of agreement for purchase, the sum of £25,000 has been paid in reduction of the mortgage loan."

BIRMINGHAM AND THE BLACK COUNTRY

display signs of tentative weakness as regards some lines of hardware and general productions. Iron I have already alluded to. The end of the quarter may be one cause of the current quietude, and the elections another, but whatever the cause the effect is undoubted. In one branch, brass and copper goods, the associated metal rollers, tube and wire drawers, have already announced an official general reduction of one farthing per pound in their goods. Some of the hollow-ware makers are reported to be accepting export orders at 5 per cent. reduction, and various goods, such as trays, traveling boxes, &c., are 10 per cent. weaker. On the other hand, galvanized goods are strong and firm, recent cables advices from Australia showing buoyancy in that important market. In most of the lines of hardware which are ruled by the prices of sheets, matters are stationary, and will remain so until after quarter-day. Odd sorts of goods are here and there in sustained request, but, as a rule, quietude prevails, and producers are becoming somewhat anxious as to the future.

FOREIGN.

FRANCE.

(Moniteur des Interets Matériels.)

PARIS, March 27, 1880.—The fine weather has had the effect of restoring transportation throughout the country to a normal condition, imparting life to trade in nearly all its branches. Copper.—There has not been much doing, but we are steady; Chili Bars we quote 175.50 @ 180.50 francs the 100 kilos; Ingots and Slabs, 185 @ 190.50; Best Selected, 195 @ 197.50, and pure Corcoro Ore, 180 @ 185. Marseilles has also been quite inactive, with a drooping tendency. They quote Spanish in slabs, 137.50; Red Tokat, 165; small Refined Ingot, 165. Sheet Iron, 205; Bolts, 205; and Yellow Metal Sheathing, 195. Tin has been quiet at Paris. We quote Banca, 245.50; English Refined, 235, and all other sorts, 240. Marseilles has been quiet. They quote English Refined 235.50; Banca, 245; and Straits and Billiton, 240. Lead has declined 4 francs in this city. We quote the same here and at Havre, 45 @ 45.50. Marseilles is unaltered. They quote Bessemer 45; Pipe and Sheet, 45; and Shot, 50. Spelter has also been ill sustained; we quote Silesian, 55; other good brands, 55. At Marseilles Vieille Montagne and French Sheet Zinc have been selling at 61.50 and old Remelted at 45 francs the 100 kilos. Iron.—A certain amount of weakness has been perceptible during the week under review, due to some disappointment with respect to the Old Reel in the American market. Another disappointment has occurred, while some makers tried to place certain lots of Tramway Rails in this market. We now quote the following: Iron 27; and Sheet Iron for building, 31 @ 32 francs. In the Haute-Marne the activity has continued undiminished. Mixed Rolled Iron, there are at 265 @ 275 francs for prime quality. Mixed Machine No. 20 sells at 270 @ 275. In Pig Iron the dealings have been restricted for the want of available stock. Moutage No. 2, sells at 120 @ 125 francs. All iron castings remain in good request, with an upward tendency. There is great irregularity in prices, the various makers differing a great deal in price among each other. At the North, Beams, Coaks, and other sorts, are in great demand; for the latter no fresh orders are taken except with the proviso of delivery after three months. We hear that the Denain and Anzin Blast Furnace works have just purchased a valuable piece of iron ore mine at Hussigny, in the Meurthe and Moselle. At Haumont the inundations of the Sambre had stopped work in the St. Marcel and Providence forges, but operations have now been resumed. We are informed that at the Creuzot the electric light will be introduced. Messrs. Ferry, Curicque & Co. are about to found steel works. Coal.—The difficult transition from the old to the new, Coal is gradually settling down to more manageable figures, the more so as the demand for households now diminishes rapidly. Coal for industrial purposes, nevertheless, maintains its firmness. St. Etienne reports the dispatch of 6200 car loads of Coal, against 6381 and 6281 the previous two weeks, which proves that Coal shipments are returning to a normal standard.

BELGIUM.

(Revue Industrielle.)

BRUSSELS, March 27, 1880.—The iron market has been much firmer than last week; there has been no improvement, but the drooping tendency has been arrested. The Angleur Steel Works have purchased the complete material of the Widen Works belonging to the Essen group, to be taken down and shipped to this country, including two converters, and the Angleur will then be able to turn out 320 @ 330 tons per diem, instead of 120 @ 130; the change will be completed in four months all for the purpose of meeting the increased demand for goods made by the Thomas process. There is much irregularity in prices; it is to be hoped that this may soon make room for a more stable condition of affairs. Pig Iron remains steady at 9 @ 9.50; Sheet Iron is moving off slowly at 25 francs. Meanwhile, the general aspect is an unexcited and quiet one; there is, however, a tolerably good opinion as regards the immediate future and the approaching spring trade. Coal.—For the past fortnight there has been little or nothing done in contracts for future delivery, most people preferring to await the month of April, when the price of Coal will settle down to a less variable basis in all likelihood; this, of course, refers to Coal for industrial requirements. At the same time, the price of 14 francs, and Coke at 30 francs. The General Society has just acquired the St. Martin Coal mines at Marchienne-au-Pont; it will probably manage the same, together with the Reunion mine at Mont-sur-Marchienne.

GERMANY.

(Borsenhalle.)

HAMBURG, March 27, 1880.—We receive the following week's summary from Dortmund: "The market has been much firmer than last week; there has been no improvement, but the drooping tendency has been arrested. The Angleur Steel Works have purchased the complete material of the Widen Works belonging to the Essen group, to be taken down and shipped to this country, including two converters, and the Angleur will then be able to turn out 320 @ 330 tons per diem, instead of 120 @ 130; the change will be completed in four months all for the purpose of meeting the increased demand for goods made by the Thomas process. There is much irregularity in prices; it is to be hoped that this may soon make room for a more stable condition of affairs. Pig Iron remains steady at 9 @ 9.50; Sheet Iron is moving off slowly at 25 francs. Meanwhile, the general aspect is an unexcited and quiet one; there is, however, a tolerably good opinion as regards the immediate future and the approaching spring trade. Coal.—For the past fortnight there has been little or nothing done in contracts for future delivery, most people preferring to await the month of April, when the price of Coal will settle down to a less variable basis in all likelihood; this, of course, refers to Coal for industrial requirements. At the same time, the price of 14 francs, and Coke at 30 francs. The General Society has just acquired the St. Martin Coal mines at Marchienne-au-Pont; it will probably manage the same, together with the Reunion mine at Mont-sur-Marchienne."

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, March 20, 1880.—The iron market here has been devoid of interest; no change has occurred in prices. The Bohemian rolling mills have resolved not to do business any more with the dealers who have of late depressed prices; it is believed that the dealers will in future be more careful and not provoke the displeasure of the mills if it can be helped. Crop prospects in Austria are promising; it is hoped that we shall have a good spring campaign in consequence, notwithstanding the higher prices now ruling. The best proof that our iron masters have a good opinion of the future is the projected proposal to be submitted by the board of directors of the Austro-Hungarian Furnace Company to blow in a fresh blast furnace, for which purpose the necessary funds are to be voted for at once. The business in Bar Iron is more active in Bohemia and Silesia than in the Alpine countries of Austria, but this is due to the latter spring regions. The retail hardware trade lacks activity. The intelligence that Russia has sent last year for railway cars, this way is not confirmed. The number of cars wanted by the Warsaw-Vienna Railway is 1000, for which the Simmering, Hernalis and Prague companies have had to tender a month or more ago, but have not yet been answered. A number of German and Russian makers have also made tenders for the same lot. For the 300 cars for Upper Silesia, the makers among whom is even still greater. Metals are quiet here. We quote in florins the 100 kilos: Copper, 85 @ 88; Tin, 120 @ 125; Antimony, 85; Lead, 25 @ 28; Spelter, 45 @ 48; Zinc, 25 @ 27; and 27 @ 28; Brass, 45 @ 48; Nickel, 57 @ 58; 4.50 florins per kilo, and Manganese, 30 @ 35 florins the 100 kilos.

HOLLAND.

(Koch & Vletterboon.)

ROTTERDAM, March 23, 1880.—Tin.—The market is quiet. Banca to be delivered from the March sale impending has been sold at 53.50, and from the May sale at 53.50 guilders the 50 kilos. Billiton on the spot sold at 52.50, and June delivery at 53.

SPAIN.

(Cronica de la Industria.)

MADRID, March 15, 1880.—The official statistics of the foreign trade of Spain in 1879 have been published. We extract therefrom the following items of export:

| | 1879. | 1878. |
|---------------------------------|-----------|-----------|
| Quicksilver..... | 2,100 | 1,371 |
| Copper, in bars, slabs, &c..... | 30,834 | 1,377 |
| Iron and Steels..... | 28,351 | 9,716 |
| Lead, in pigs, slabs, &c..... | 100,336 | 92,842 |
| Calamine..... | 27,613 | 33,533 |
| Copper ore..... | 459,576 | 497,959 |
| Iron ore..... | 1,004,118 | 1,315,434 |
| Other minerals..... | 35,577 | 48,301 |
| Total..... | 1,738,504 | 1,921,833 |

The Copper shipped in 1879 amounted to \$3,103,277, and the Copper Ore to \$6,149,277; together, \$9,252,554. The increase of 19,457 tons in Copper and 33,317 in Copper Ore will be noted. The increase in Quicksilver of 729 tons, and in Lead of 9,994, is also important, while there is a decrease of 5920 tons Calamine and of 25,316 tons in Iron Ore.

EAST INDIES.

(Schmidt, Kustermann & Co.)

PEWANG, Feb. 28, 1880.—Tin.—In consequence of the Chinese holidays, which began on the 20th inst., little business has been transacted. The only sales have been 25.50 piculs for the United States at \$19.25 per picul, and 3000 piculs for China and India at \$19.30 @ \$20.30. The metal closes weak at \$19.125 with a stock in bazar of 1300 piculs. Exchange has been drooping all along in response to duller advices from India. The banks have gradually come down from 3/10 for 4 months' drafts to 3/4.

CHILI.

(Weber & Co.)

VALPARAISO, Jan. 29, 1880.—Copper.—There has been great business during the past few days, the sales effected being 2207 quintals Lambert at \$10.85 per quintal on board; 1192 quintals sundry lots at \$10.25 @ \$10.40 on shore here, and 17,000 quintals Regulus at \$11.35 @ \$11.40 on board. Freight is declining steadily. The entire coast sends vessels to be chartered this way, and there is no nitrate for them. Charters have been made from Lota to Swansea direct at 55/ for orders; to Swansea alone at 57/6; to Liverpool at 60/; and to Havre at 62/6. Exchange is unaltered.

(El Ferrocarril.)

VALPARAISO, Feb. 19, 1880.—Copper.—In former years Chilean Copper production used to amount to about two-thirds of what the entire world turned out. Since then other countries have begun to produce extensively, notably the United States and Spain, the latter country having an annual output of 25,000 tons. Chili, therefore, now furnishes about one-half of the entire production of the world, instead of the former two-thirds. Since January 29, the drooping tendency of the English Copper has caused a gradual decline here, and from \$10.75 per quintal we have receded to \$11.85. At the close the leading producers again ask \$11.95 ashore. Nothing has transpired in Regulus, nor in ore; for the latter \$3.50 for 25 might have been obtained. The sales of the fortnight have been 21,050 quintals at \$10.75 aboard at Lota, 1311 ditto at the same price, 135 on shore here at \$11.85, 230 ditto at \$11.85, and 130 at \$10.40 on shore here. We quote Regulus, 50¢ on board, \$1.50 nominally. Exchange, 60 days on London, 36d. per dollar; 90 days, 35½d.

An American Cable Proposed.

Reports have been in circulation of late in the mercantile community concerning the organization of an American company to lay another cable across the Atlantic. The high tariff rates which are charged by the existing companies are greatly complained of by merchants, particularly those houses who have to use the cable extensively, and whose bills, in many instances, amount to \$50,000, or even more, annually. These considerations have led to the organization, in this city, of a company for the purpose of cheapening the cost of ocean telegraphy. The organization is known as the New York Land and Ocean Telegraph Company, the president being Mr. John H. Hebert, of the firm of J. H. Hebert & Co., grain merchants at No. 73 Broad street, and the secretary, Col. Frederick A. Sawyer. Among the directors are merchants in New York and Pennsylvania including Messrs. J. A. Coutant, Nicholas Brandt, John H. Hebert and James C. Jewett. At the offices of the company in this city it was stated that the British government has already granted them the perpetual right to land and operate one or more cables in England. This concession was granted within a few months past, and the United States government, by executive authority, have granted a similar right. In order to avoid having too long a cable, however, an intermediate landing is required so as to reinforce the current, and for that purpose it is proposed to make a connection by way of the Island of St. Pierre or Miquelon, off the coast of Newfoundland, but the right to do so has not yet been obtained from the French government.

Mr. J. C. Jewett, one of the directors, says that the proposed capital of the new company is \$4,000,000, and that well-known bankers and financiers in London have made a standing offer to subscribe one-half the entire capital stock whenever all the necessary concessions shall have been secured for landing one or more cables. The India Rubber, Gutta Percha and Telegraph Works Company, of England, have offered to lay a complete working cable for \$200,000, and they guarantee to maintain it in good condition for one year free of expense. The capacity of the cable will be 20 words per minute. The proposed rate to be established for messages is 18 cents per word, or less than one-quarter of the charge made by the Direct Cable and present English companies. This, it is claimed, would give a yearly revenue of \$1,500,000, out of which the net earnings would be about \$1,000,000, or sufficient to pay a dividend of 12 per cent. to the stockholders and put by a reserve fund of 10 per cent. The present English cable companies, Mr. Jewett says, represent, as capital in stock and indebtedness, about \$60,000,000, on which a dividend of 6 per cent. is to be paid and 10 per cent. laid aside yearly as a reserve fund. The new French cable represents \$16,000,000. Much of this stock was probably issued for services, rights, profits to promoters, &c. Being so loaded down, it is impossible for these companies to make a reduction in their tariff except by reorganizing and wiping out 75 per cent. of their stock and indebtedness. Mr. Jewett says the arrangements for the proposed American cable cover the expenditure of \$4,000,000. This will provide for the laying of a cable of the most approved modern construction, furnished by one of the best and most experienced manufacturers of ocean telegraph cables in England, and will be laid under a guarantee of successful working.

The Miners' Union Revived.

The delegates engaged in forming a county organization of the Miners' Union have recently been in secret session at Pottsville, Pa. The proceedings have not been made public, but an address has been issued. The promoters of the reorganization have been at pains to explain that its object is nothing but to form a beneficial society for its members; but it will be seen from this document that the order proposes to have, if possible, as large a share in the management of the coal trade as it had when it was broken up in 1875. Following is the address:

Be it known that we, the miners and laborers and mechanics working in and around the mines of Schuylkill County, have deemed it wise to reorganize the M. and L. B. A. (Miners' and Laborers' Beneficial Association) of this county, for the purpose of mutual protection and benevolence, taking our past sufferings and isolated condition to justify us in this course. It is now almost six years since our old union went out of existence, and in this time we have considered the fact that, without organization among us, we are no better than slaves. There is a general revival in business at this time, and every industry seems to take the boom with the exception of the coal trade; and, as we are directly interested in the production of this article, we ought to exert our influence in bringing about a harmonious state of affairs. Every industry was advanced from 50 to 100 per cent., while coal has only brought 16 per cent., and the coal magnates have failed to agree in restricting the production of this article, which, if accomplished, would tend to ameliorate the condition of the workingmen.

Now, were we in a united state we could effect a restriction without injury to our employers. The want of a union has been severely felt among us by the way we have been treated in the past, in working from 10 to 14 hours per day and for wages that would tax every sinew and every bone in our system to its utmost capacity to eke out a subsistence of the poorest. We, as a body of men, have to incur great risks in producing the coal, and as such we should have a fair compensation for our labor; but instead of getting justice we receive very harsh treatment at their hands, and we have seen no acts perpetrated by the miners to warrant their employers using them in this manner, except that we were in a state of actual submission. Now we have effected a permanent organization of the Miners' and Laborers' Benevolent Association, of Schuylkill County, and by our past experience in the old union, we have seen that the old by-laws worked to the detriment of the miners and laborers, and, at the meeting held to-day, we have modified them and purged them of all objectionable matter, that there would be no obstacle in the way. What we found valuable we have preserved to guide us in the future. We have been charged from time to time by the press of the country as a secret organization—a band of outlaws combined together for the express purpose of destroying property and resorting to riot and all unlawful means to obtain redress. These charges we deny, as they have been gotten up by men who are opposed to us, to injure the cause we are now embarked in. These misrepresentations are utterly false and without the slightest foundation. The objects of this association are not to infringe on the rights of our employers, but simply to advance the interests of labor and capital, those interests being universally acknowledged to be identical. We have now put before the public our aims and objects, and we now call on the workingmen of this county to support us in our actions here to-day. Those places where the union is not organized we call on to throw off the thralldom of slavery and awaken to a sense of their duty. And now, in conclusion, we may say that, if no unforeseen accident occurs to interrupt its progress, we predict a friendly, sympathetic, and advantageous future to the workingmen of Schuylkill County.

MINING AND MINERAL ITEMS.

COAL.

Coal mining in the Yough Valley the present season is the liveliest for many years, and it has been found necessary to increase the present facilities.

The Philadelphia Coal Company will proceed at once to open up their new colliery at Raphanock Station, on the Lehigh Valley road. The breaker, the plans of which have already been adopted, will be one of the largest and most complete in the valley, and will be known as No. 5.

Sharon, Pa., is to have a new coal road for tapping the coal mines of Hickory township, Mercer County.

The coal mine on the Dr. Irvine farm in West Middlesex, Pa., known as the Bailey shaft, which has been idle since 1873, is being reopened.

The new coal works recently opened near Walker's Mills, Allegheny County, Pa., will soon be ready to run coal to market.

Jackson's new coal mines on the Panhandle Railroad are being rapidly prepared for business.

IRON.

A vein of rich ore between 5 and 6 feet thick has been discovered on the property of Mr. Chas. Drumm, near Furnaceville, Tuscarawas County, Ohio.

Shafts will be sunk all over the ore belt of Lehigh and Northampton counties, Pa. The business is especially active along the Wind Gap Railroad.

In Berks County, Pa., iron ore mining is in full operation. New mines are being energetically worked, and prospecting is carried on carefully in this section for new discoveries of ore. A number of rich and valuable deposits of ore have been found, and some mines that were abandoned during and prior to the panic, because they did not pay expenses, are extensively worked.

The Pittsburgh Clay Pot Co. are in receipt of an order for an outfit of pots for a large factory, and have the promise of another large order. Forty pots are drying, and additional ones are in the "docks." Ten prominent glass firms of Pittsburgh are members of this company.

PATENT DECISION.

Hardware dealers will please take notice of the decree of Judge Lowell, of the United States Circuit Court, in the case of Millers Falls Company against Quimby S. Backus, for infringement of Bit Brace Patents, which decree was in favor of the Millers Falls Company. The full text of the opinion may be found on page 11 of *The Iron Age*, of date December 18, 1879.

We have now obtained three separate decrees against three different manufacturers, and shall continue to prosecute all infringers. When the manufacturers are able to pay the damages we shall in no case trouble dealers, but when manufacturers are unable to pay we must ask the dealers to remunerate us, else responsible dealers might combine with irresponsible makers to render worthless the most valuable patents. Any reasonable man can see the point, and we have before given all dealers sufficient notice.

MILLERS FALLS CO.,
74 Chambers street, New York.

PATENT

ANTI-WINDOW

RATTLER,

FOR

Dwellings, Cars, Steamboats, &c.

The Anti-Window Rattler supplies a long needed want; it is so simple in construction that it can be used on any window, and so complete that it will prevent the slightest shaking, no matter how great the jar or how old the sash. As shown in cut, it consists of a rubber wheel in a nickel-plated or brass frame; is ornamental as well as useful, and does not interfere with raising or lowering the sash.

HEATON & DENCKLA, General Agents, 507 Commerce St., Philadelphia.
GRAHAM & HAINES, Agents, 113 Chambers St., New York.
OTIS D. DANA, Agent, 26 to 32 Pearl St., Boston, Mass.

F. HABERMAN,

MANUFACTURER OF

Stamped, Japanned and Plain

TINWARE,

AND THE CHEAPEST AND BEST

OIL AND GAS STOVES
IN THE MARKET.

NOTE.—These Stoves are made under license from the Kerosene Lamp Heater Co., the royalties are paid by me, and the Stoves have license tags attached, so that dealers may purchase and sell them with perfect safety.

SEND FOR CIRCULARS.

294 PEARL STREET, NEW YORK.



THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Millbrook, N. Y.

Also sold by leading wholesale houses.

Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.



Bemis & Call Hardware & Tool Co.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.

For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass.

Philadelphia "STAR" Bolt Works.

NORWAY IRON

FANCY HEAD BOLTS,

Carriage & Tire Bolts.

Star Axle Clips, &c.

TOWNSEND, WILSON & HUBBARD, 2301 Cherry St. Philadelphia, Pa.

NATIONAL
Horse Nail Co.

MANUFACTURERS OF

FINISHED

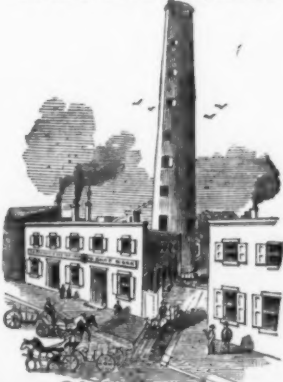
(BRIGHT OR BLUED)



These nails are made of the best brands of NORWAY IRON, and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO.,
VERGENNES, VT.
DURRIE & McCARTY, Agents,
No. 97 Chambers St., New York

The Oldest Shot Tower in America.
FOUNDED JULY 4, 1808.

THOMAS W. SPARKS,
Manufacturer of
SPARKS'

American Chilled Shot.

Rivalling the English and all Others.

STANDARD DROP & BUCK SHOT
AND BAR LEAD.

121 Walnut Street, Philadelphia.

St. Louis Malleable Iron
Company.2116 MARKET STREET,
ST. LOUIS, MO.

HENRY M. FILLEY, President. JOHN D. FILLEY, Secretary.

MANUFACTURERS OF

Malleable and Gray

Iron Castings,

GENERAL HARDWARE, &c.

W. G. FOSSICK,

Engineer and Iron Agent,
86 Cannon St., London, England.

Iron and Steel Rails,

Bars, Angles, Plates,

Pig Iron & Puddled Bars.

Old Rails, Scrap Iron, Steel Rail Ends

c. f. i. American, or f. o. b. European ports.

Contracts negotiated on the most favorable terms.

Banks: Barnetts, Hoares & Co., London.

RIEHLÉ BROS.

STANDARD

SCALES

AND

TESTING

MACHINES

Patent "Self-Adjusting" Railroad Track Scales, pronounced "the most accurate and durable" over all competitors at World's Fair, 1876. In use by Pennsylvania, Lehigh Valley, Baltimore and Ohio, and other Railroads. Patent Coal and Hay Scales. Warehouse and Platform Scales and Scales for all purposes. Machines for testing materials, all sizes.

Works, 9th st., at Master; Store, 42 S. 4th st., Phila.

New York Office: 51 Liberty Street.

"DRAW CUT"

BUTCHERS' MACHINES.

Choppers, Hand and Power

Stuffers,

Lard Presses.

Warranted thoroughly made

and the BEST in Use.

MURRAY IRON WORKS,

Burlington, Iowa.

R. C. PURVIS,

Manufacturer of

Octagon

Tea Pots.

Rear of 407 Cherry St., Philadelphia, Pa.

Send for Price List.

Established in 1839.

Formerly L. & A. G. Co.

L. COES & CO.

Manufacturers of L. Coes'

GENUINE IMPROVED

AND MECHANICS

Wide Bar Full Length.

Wide Bar Full Length.

Patent Screw Wrenches

UNDER PATENTS DATED

JUNE 26, 1866,
MARCH 23, 1869,
REISSUED 1870.NOVEMBER 10, 1863,
FEBRUARY 23, 1864,
REISSUED JUNE 1, 1869,
IMPROVED AUG. 1, 1877.

The back thrust when in use borne by the SHANK instead of the Hand's
None genuine unless stamped "L. COES & CO."

WORCESTER, MASS.

Warehouse, 97 Chambers St., & 81 Reade St., N. Y.
DURRIE & McCARTY, Sole Agents.

The 1880 Pennsylvania Lawn Mower

OUTTRIPS ALL COMPETITORS.

LIGHT DRAFT AND EASILY ADJUSTED.

Every Machine Warranted to Work as Represented.



Points Claimed as being Meritorious:

Lightness combined with Strength in construction.
It runs more easily.
It will cut longer grass.
It is more durable.
It requires less repairs.
It cuts the grass more smoothly.
The attractive appearance of the machine.
It is the lightest machine in use, and all this is necessary to satisfy our customers of its superiority is to place it in competition with any other machine in the town in which they may reside.

PRICE LIST.

| Width of Cutter. | Style. | Power required. | Weight. | Price. |
|------------------|---------|-----------------|-------------|---------|
| 10 inch. | 8 inch. | A Child. | 30 1/2 lbs. | \$14.00 |
| 12 " | 8 " | A Lad. | 33 1/2 " | 18.00 |
| 14 " | 8 " | A Lady. | 36 " | 20.00 |
| 16 " | 8 " | One Man Size. | 38 " | 22.00 |
| 18 " | 8 " | " | 41 " | 24.00 |

NEW MACHINES.

For Cutting Long Grass

15 inch, 10 1/2 inch Driving Wheels, 6 1/2 inch
Cylinder, Man Size, 48 lbs. \$23.00
17 inch, 10 1/2 inch Driving Wheels, 6 1/2 inch
Cylinder, Man Size, 51 lbs. 25.00

For Sale By

DUCHARME, FLETCHER & CO., Detroit, Mich.
LOCKWOOD, VANDORNO & MILLER, Cleveland, O.
KRUSE & BAHLMAN, Cincinnati, O.
PRATT & CO., Elmira, N. Y.
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Russell & Erwin Mfg. Co.,
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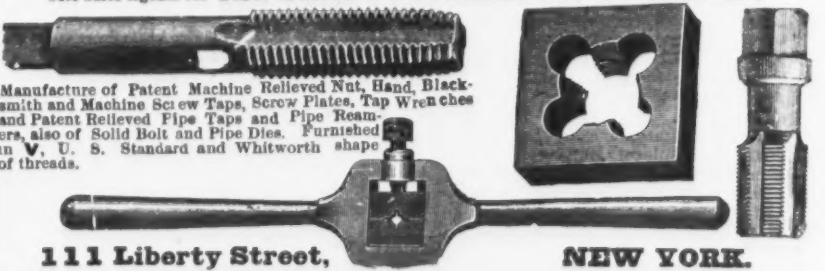
THE NEW
"CHARTER OAK"
LAWN MOWER.

The most beautiful and perfect Lawn Mower in the world. It stands to-day at the head of the list of Lawn Mowers in the United States and Europe. It is mounted on two large driving wheels or pulleys, and instead of being on the outside of the frames, to run in the uncut grass, they are placed inside the frames, back of the cutting-blades, running on a shaft, each independent of the other, allowing the machine to be turned either to the right or the left without injury to the sod, and to be turned around in a circle no greater than its own length, and cutting at the same time. Those desiring a perfect Lawn Mower will find the "CHARTER OAK" far superior to any other. It is more durable, easier to adjust, operate and keep in order, and the driving wheels being inside the frames, enables the operator to cut the grass clean around walks, drives, flower-beds, trees and shrubbery.

Manufactured in Five Sizes.
8-inch, 10-inch, 13-inch, 15-inch (standard),
18-inch.

H. S. MANNING & CO.,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers, also of Solid Bolt and Pipe Dies. Furnished in V, U, S. Standard and Whitworth shape of threads.

111 Liberty Street,

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HUNTER'S Rotary SIFTERS.

Mixer, Scoop, Measure, Weigher, Egg Beater, Rice Washer, Tomato, Pumpkin, Starch, Wine and Fruit Strainer.

The greatest combination known, and pronounced by the only first-class sifter in the world. Made better, of better stock, sifts much faster, and saves more material than all other sifters. Made in two sizes: No. 1, 3 pts; No. 2, 5 pts. Liberal discount to the trade. Please mention this paper, and send for illustrated Price List.

J. M. HUNTER & CO., Sole Manufacturers and Owners,
38 W. Fourth St., Cincinnati, Ohio.

HOOPES & MERRY,

Manufacturers of

"LION" Brand or B. B. "PHENIX" Brand or Best Charcoal

GALVANIZED SHEET IRON,

539, 541, 543, 545 and 547 West Fifteenth Street, New York.

Corrugated Sheet Iron, Black or Galvanized. All kinds of Ironwork, Tinned or Galvanized.

MARTIN'S ENGLISH HORSE CLIPPERS.

J. J. Shannon,
1707 Market St.,
PHILADELPHIA.



Recommended as the best Hand Clipper made.
\$3.25 EACH.
Extra pieces for sale.

Send for circular.

The Ancient Copper Tools of Lake Superior.

The Ontonagon *Miner* says: About 20 years ago there was a large collection of copper tools in the Bigelow House, at Ontonagon, with other copper specimens on public exhibition, where they remained for several years; and there are now copper knives, spears, hooks and chisels in the possession of a few of the old inhabitants of Ontonagon. All these tools have the same appearance as those found buried in the mounds and beneath the soil and dug up at various places and at divers times within the State of Wisconsin, and placed, together with the stone implements found, among the collections of the Wisconsin Historical Society at Madison. The copper arms, implements and tools collected by that society number 109—72 of the spears have sockets, sometimes called wings, left open on one side, to receive wooden shafts; many of the sockets have holes punched for a pin to fasten the shaft or handle, one of the copper pins still sticking fast in its place. The sockets are swaged or hammered, other tools have round or flat tangs to thrust into the wooden shafts, and some are notched or bearded to hold better in the wood. The knives found are intended to be stuck in wooden handles, but some have handles of the same piece of copper with its blade; one has a copper handle bent into a hook.

The axes weigh from 4 ounces to 4 or 5 pounds. In one mound at Prairie du Chien an ax weighing 2½ pounds and 8 inches long was found, lying on a large flint spade 14 feet below the surface of the mound and among human bones. A socket spear head—which shows its rivet—was found on a knoll in plowed grounds in Waukesha County. A chisel was found 10 feet below the surface in cutting a road through a mound in 1871. Knives, fish-hooks, and other implements have been found near the Ontonagon river, probably washed out of the bank. A lance head found in Dodge County, Wisconsin, has a lump of silver on one side of it, called the "ear tag of Lake Superior." Large numbers of tools have been turned up in plowing and in digging foundations of houses, or in sinking wells, including chisels, adzes and boring tools, similar to a pod auger.

All these implements of copper were plainly fashioned with hammers, and probably by heating the metal as a blacksmith would. The extreme ductility of the Lake Superior copper renders it an easy matter, even with the rude stone hammer, to forge tools without a flaw, which the ordinary copper obtained from sulphurets will not do. The tools so far found do not seem to indicate that the workmen knew of any process of alloy for the purpose of hardening the metal, and even if tools should hereafter be brought to light that would seem to indicate a mixture, we have on Isle Royale veins containing yellow native copper, the same, to all appearance, as the common red copper, except in color, which is yellow, and soft like gold or brass. The present race of Indians had no knowledge of working copper into implements of any kind, and have no traditions of the mines having been worked, or, indeed, of their existence, their knowledge only extending to a few pieces of float copper accidentally found near the surface, and which they esteemed as divinities or as presents from the Great Spirit, who dwelt beneath the water. They keep these pieces wrapped up with other valuables, and in some families these pieces have descended from time immemorial, and are usually kept by what are called "Medicine Men." At Grand Portage, on the north shore of Lake Superior, one of the medicine men has a round boulder of copper always with him, from which he rasps off fine particles to mix with the medicine he gives to the sick who come under his care. On the other hand, the men who wielded the stone hammer wrought the copper without the fear of the gods and for practical utility.

LABOR AND WAGES.

The strikes and threatened troubles in the coke regions have induced the operators to bring in other labor. A party of Hungarians have just been put at work by the firm of H. C. Frick & Co., Bradford, Pa., the men having been engaged to work in their Somerset County mines.

There is trouble among the miners on the Baltimore and Ohio Railroad, near Pittsburgh, many of the pits being informed by the bosses that three cents per ton will be the price for digging coal on and after April 1. Several of the pits are already working at this price.

The following circular has been issued from the General Manager's office of the Panhandle Railroad Company. The compensation of the officers and employers upon the P. C. & St. L. Railway, Chartiers Railway, P. W. & Ky., C. & M. V., C. C. & I. C., L. M., J. M. & I., and I. & V. lines will be restored to that in force prior to June 1, 1877, to take effect from and after April 1, 1880.

The solution of the problem how to avoid strikes among coal miners is about to be attempted by a company consisting chiefly of practical miners, who will open a mine about the 5th of April at Walker's Mills, Pa., at which there are to be no strikes. The company will dig, weigh and sell their own coal and share their well-earned profits among themselves—getting pay for nut coal and slack. The company is composed of honest, sensible men, who are tired of the manner in which the coal business has been conducted for the last few years, and are desirous of seeing a reformation in the whole business. Their company is organized on a basis of moral rectitude, industry and enterprise, besides a large amount of good, healthy muscle.

The strike of the molders at the Reading (Pa.) Hardware Works still continues.

It is stated in the Associated Press dispatches that the heaters in the Allegheny (Pa.) Rail Mill struck on Saturday last for 6 cents per ton advance. The demand was refused, and the rail mill is reported idle.

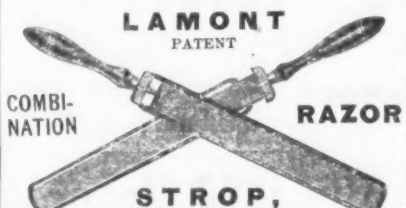
The puddlers' strike in Central Pennsylvania is virtually at an end, the men resuming at 5.50—the compromise offered by the mills.

All wages that were cut down on the Pennsylvania Railroad have been restored to former figures.

THE SLAYTON RAZOR.



PERFECTION For Portability. For Cutting Quality. For Temper.
Handles of German Silver, Nickel Plated. Blades of the Finest Steel in the World. Every Razor Fully Warranted.
L. C. TOWER, Thermometer Manufg.,
39 Exchange St., Rochester, N. Y., Sole Agent.
Canvassers wanted.



LAMONT PATENT COMBINATION RAZOR STROP,
Manufactured by **COPELAND, HALL & Co.**
(Successors to H. O. Hall & Co.)
Rochester, N. Y.

NATIONAL STEAM PUMP.

Adapted to every possible duty.
Send for Illustrated Catalogue.

WM. E. KELLY,
New Brunswick, N. J.
New York Salesroom, 40 Cortlandt St.

Watchman's Improved Time Detector,
with Safety Lock Attachment.
Patented 1875-6-7.



Mellert Foundry and Machine Co., Limited,

Manufacturers of **Cast-Iron Water and Gas Pipe** of all sizes.
Valves and Hydrants, Flange Pipe and Lamp Posts. Machinery for Grist, Saw and Rolling Mills. Also the celebrated **CANADA WATER WHEEL**, the cheapest and best in the world. Send for pamphlet.
READING, PA.

BUFFALO SCALE CO.,

BUFFALO, N. Y.,
Manufacturers of **R. R. Track Scales, Hay Scales, Coal Scales, Grain Scales, Platform Scales, Counter Scales, &c.**
Send for price list, stating what you want.

MINERS' CANDLES.

Superior to any other Light for Mining
Purposes. Manufactured by
JAMES BOYD'S SON,
Nos. 10 & 12 Franklin St., New York.

Coal.

A. PARDEE & CO.,
303 Walnut St.,
PHILADELPHIA,
No. 111 Broadway, New York.

MINERS AND SHIPPERS OF
Lehigh Coals.

The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.

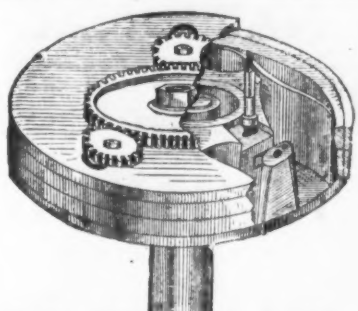
A. Pardee & Co. { HAZLETON, CRANBURY, SUGAR LOAF.
Pardee, Bro. & Co. LATTIMER
Calvin Pardee & Co. HOLLYWOOD.
Pardee, Sons & Co. MT. PLEASANT.

THE HOBOKEN COAL CO.,
Dealers in
SCRANTON, LEHIGH and other COALS

Retail Yard on D. L. & W. Railroad, cor. Grove and 18th sts., Jersey City. Coal delivered direct from shutes to carts and wagons. Families and manufacturers supplied with the best qualities of Coal at the lowest rates. Offices: At yard cor. Grove and 18th sts., cor. 18th st. and Newark av., Jersey City; Room 35, 111 Broadway, N. Y. General Office, Bank building, cor. Newark and Hudson sts., Hoboken. P. O. Box 217, Hoboken.



THE E. HORTON & SON CO.,
Windor Locks, Conn.
From this date a discount of 25 per cent will be made from the price list of
The Horton Lathe and Car Wheel Chuck.
February 1, 1880.
Send for Price List.



WM. SPRAGUE & CO.,
Manufacturers of
SPRAGUE'S IMPROVED Steam Engine Piston

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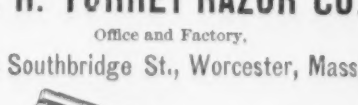
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Clark E. W. & Co., 54 Cliff, N. Y.

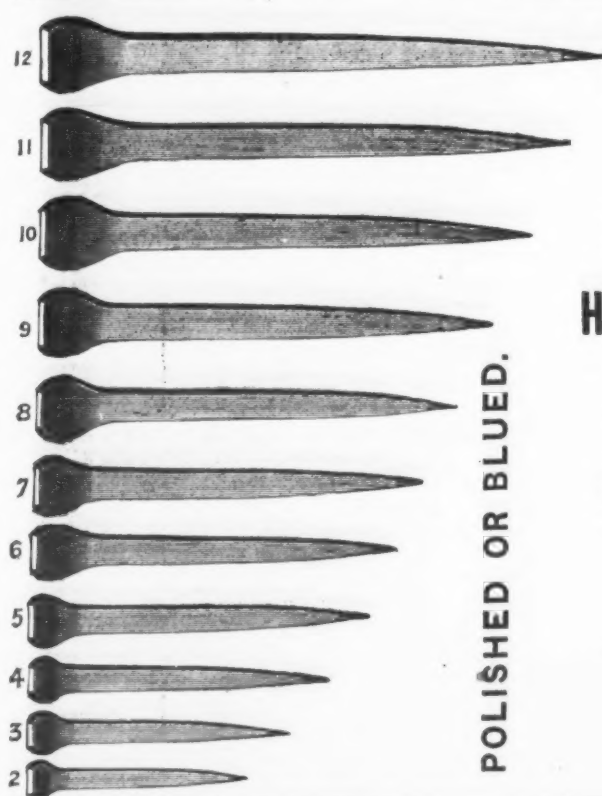
Wheeler E. S. & Co., 54 Cliff, N. Y.

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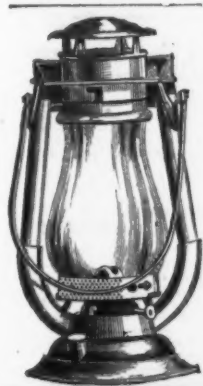
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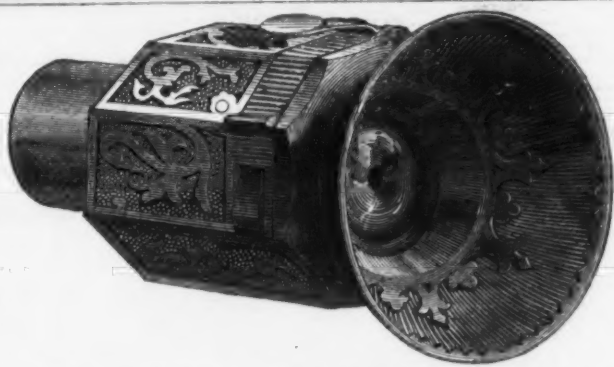
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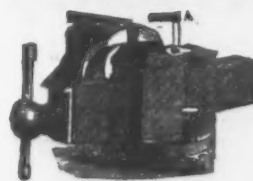
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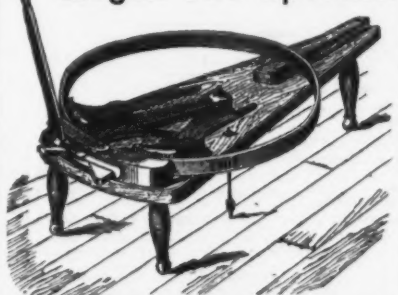
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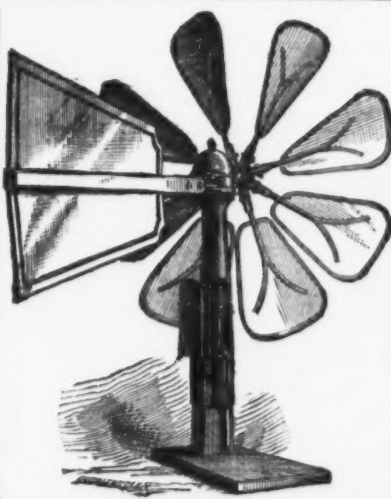
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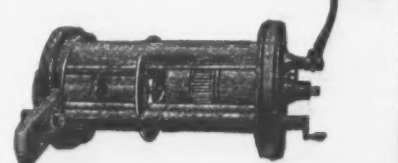
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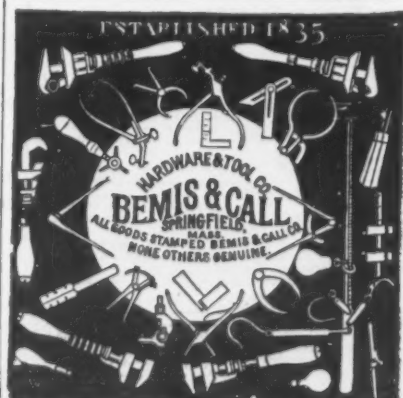
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JOHN R. WATSON, Perth Amboy, New Jersey.
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For Rolling Mills, Blast Furnaces, Foundries,
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Fire Clays, Fire Sand, and Kaolin for Sale.

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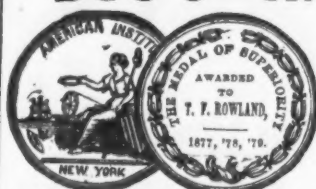
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ALWAYS FIRST PREMIUM.

NO CORNERS TO CATCH.
THROWS FREE AND CLEAR.
200,000 IN USE.

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Very Durable and Strong.

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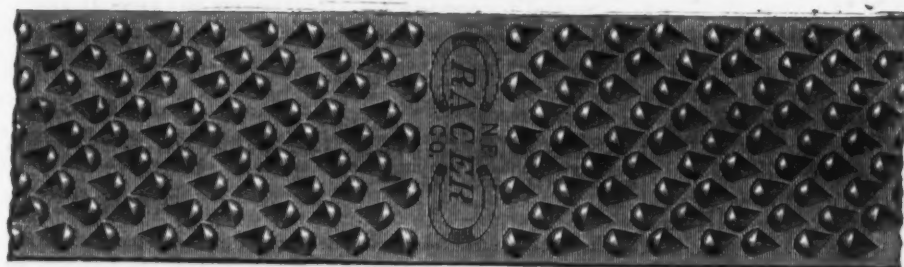
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Manufactory and Offices at Providence, R. I.

The following space will be used in illustrating our specialties, the matter being changed weekly.

IMPROVED HORSE RASPS.

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We present herewith an illustration of an ingenious arrangement of the teeth of *Horse Rasps*, from which it will be seen that the faces of each alternate row of teeth are presented to the work at reversed angles, producing an obliquity of the cutting edges, which gives a shearing or drawing cut. Thus, the substance is cut away, instead of being torn, and a much larger quantity of material is removed with the same power, than if the faces of the teeth were arranged at right angles to the edges of the rasp, as is the usual custom.

By this arrangement the teeth are much more durable, their points being less liable to crumble in use; and, as will be seen from their principle of construction, they are less liable to become clogged; the refuse, instead of being forced into the space in front of the tooth, as in the old style, is to some degree, by the very action of the operator, pressed outward, and thus made to clear itself.

For Horse Rasps of this brand, both *tanged* and *plain*, we have adopted the name of "Racer." They are made of the usual sizes, from an extra quality of "mild" steel, each tooth having a double blow, and are tempered by a process which gives them extreme toughness. The verdict of those who have used this rasp, demonstrates that it is unequalled by any rasp known.

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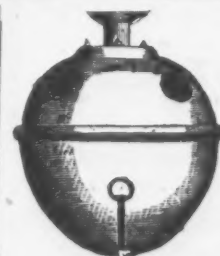
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More "heats" obtained from them than from any other Bricks known.

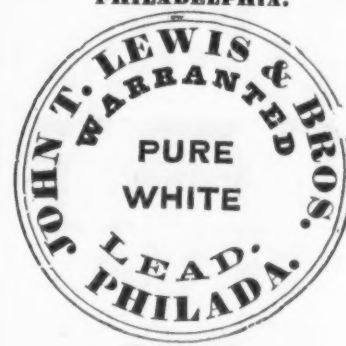
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House, Tea, Hand,
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MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge,
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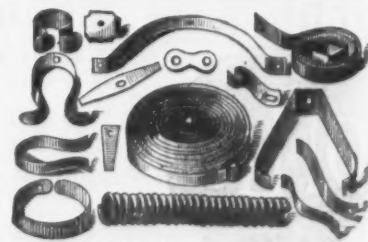
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The Atlantic White Lead
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of every description, from best Cast Steel,
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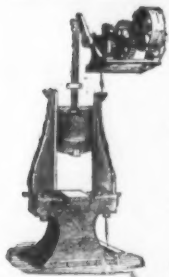
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Organs, 15 Stops, 3 set Reeds, \$200.
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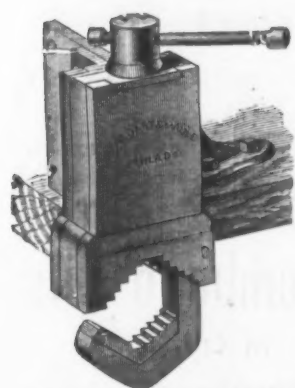
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11 Regular Sizes. Hammers from 50 lbs. to 2500 lbs.
WE HAVE A LARGE STOCK OF SPECIAL DROP PATTERNS.

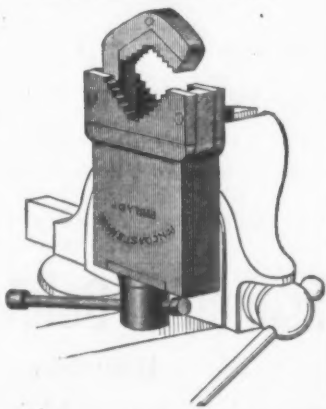
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Send for Price List.

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To meet the requirements of the large number of persons who have use for such an article, we invite attention to our Improved Pipe Vise. This Vise can be used either as a permanent fixture to work-bench, attached to angle plate or can (unlike others) be held between the jaws of any Machinist's or Blacksmith's Vise; the movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without slipping it in from end, and allows of FITTINGS BEING HELD SECURELY; the Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Drivers, and all who have use for a tool that is strong, light, efficient and cheap which can be readily carried about with kit of tools.

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TURNED MACHINE SCREWS,
One-sixteenth to five-eighths diameter.
Heads and points to sample.
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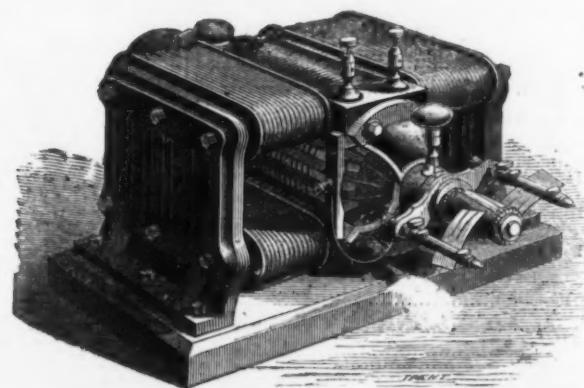
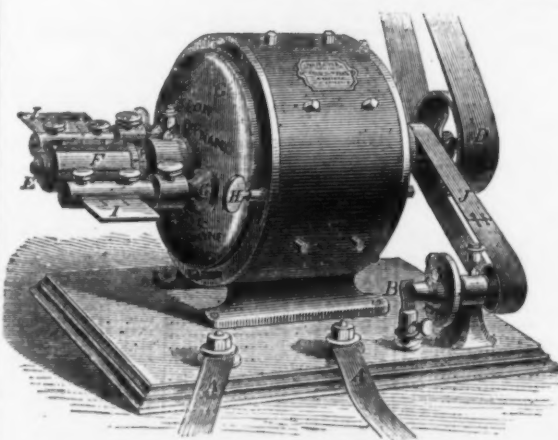
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Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

ANVILS weighing 100 lbs. to 800 lbs., 9 1/2 cents per lb., with special discounts to the trade.

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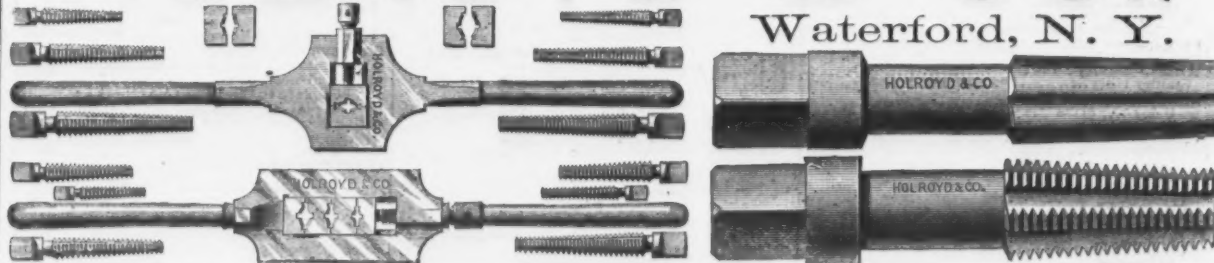
| No. | 00 | 0 | 1 | 2 | 3 | 4 |
|-----------------|--------|------|------|------|---------|---------|
| Weighting about | 5 | 10 | 15 | 20 | 30 | 40 lbs. |
| | \$1.75 | 2.25 | 2.75 | 3.25 | 4.00 | 4.50 |
| No. | 5 | 6 | 7 | 8 | 9 | |
| Weighting about | 50 | 60 | 70 | 80 | 90 lbs. | |
| | 5.25 | 6.00 | 6.50 | 7.25 | 8.00 | |

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**TO STEAM USERS**

Save Fuel and Money.

Obtain regular speed and prevent explosion by using

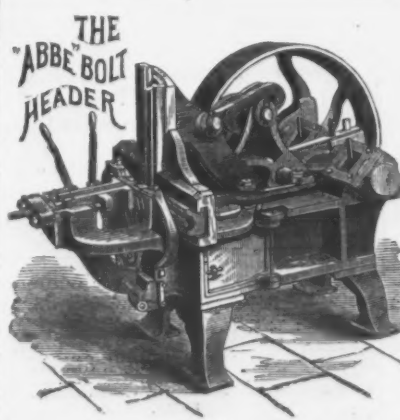
PEERLESS**DAMPER REGULATOR,**

the greatest fuel-saving appliance ever invented. Adjustable to any pressure. In ordering mention pressure. Illustrated Catalogue sent on application. We set it up and guarantee performance. Price, \$75.

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**THE "ABBE" PATENT
Bolt Forging
Machine.**

Any Imaginable Shape of Head can be Produced.

All its working surfaces above the Water and Cinders.
There are neither Gears, Cams nor Springs—every motion being positive. For particulars address

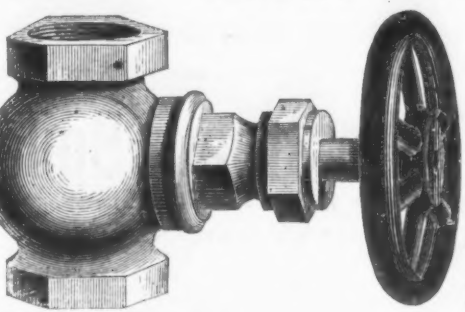
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Also Manufacturers of

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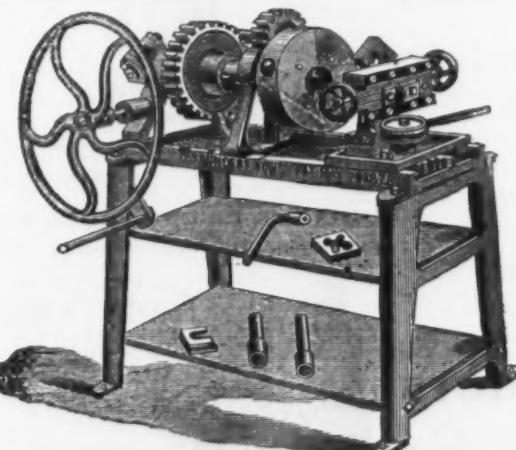


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Watson's Portable Forges,
AND GENERAL MACHINERY AND SUPPLIES
For Railways, Steamships, Mills, Mines and Manufacturers,

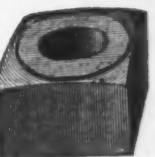
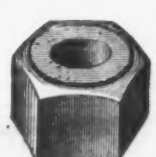
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I will send one on trial, to responsible parties,
Guaranteeing it to give entire satisfaction
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They have been pronounced by all who have used
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Malleable Iron Castings
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Clothes Wringer.**
Improved with Rowell's Double Cog-Wheels on
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Over 500,000 sold!
And now in use, giving "Universal" satisfaction
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Sold by the **Principal Jobbers in Hard-
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Special rates given for export.
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PRICE ONLY \$1.50.
Sent free, on receipt of
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It is made of iron, will
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lifetime. Just the thing
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The platform does not
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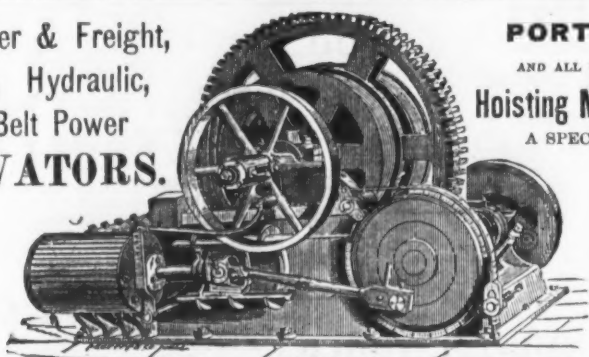


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All Styles and Sizes.
**Furnaces for Jewelers and Assayers
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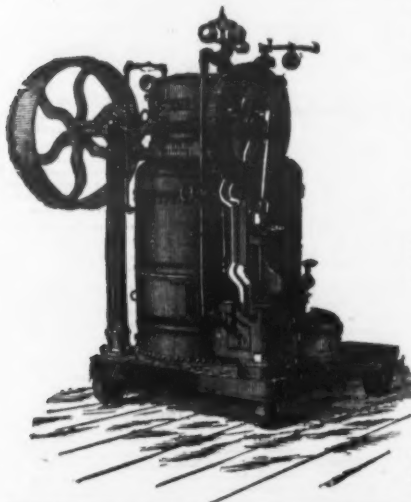
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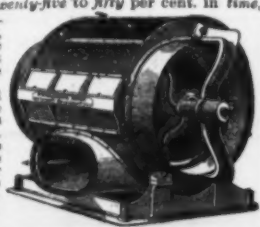


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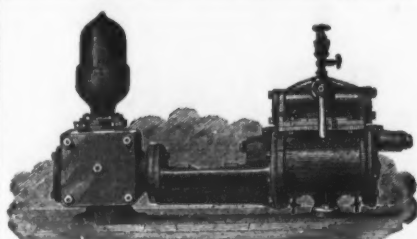
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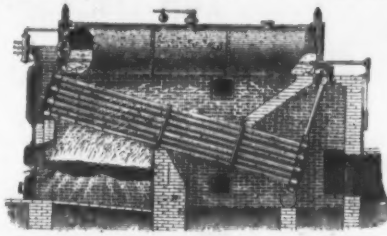
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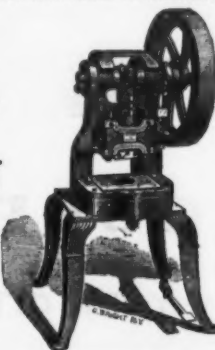
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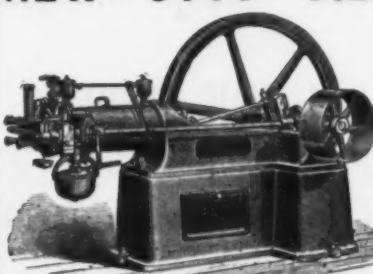


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When Stopped, all Expense Ceases.

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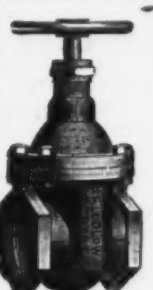
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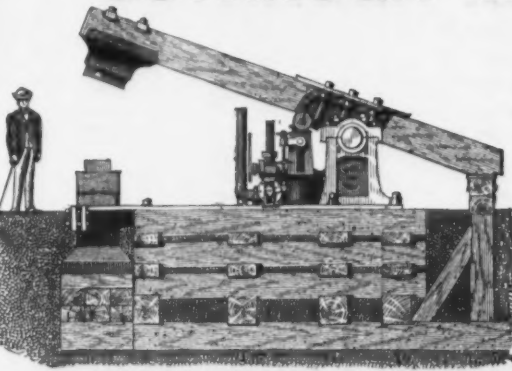
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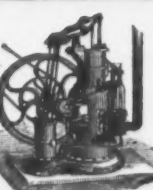
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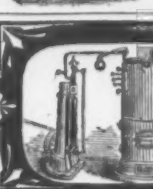


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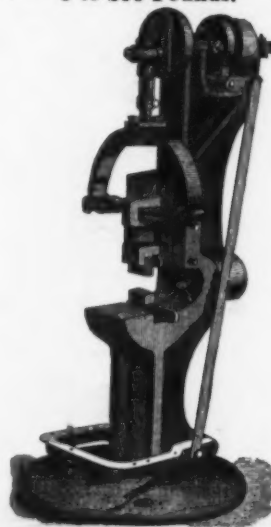
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Reduced Price List.

OCTOBER 15, 1878.

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THE JUDSON PATENT

Improved Steam Governor.

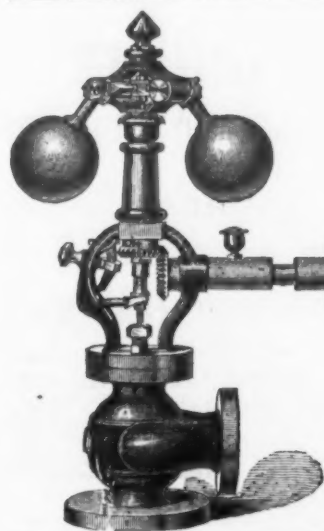
No Charge for Boxing or Cartage.

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THE SHIVE STEAM ENGINE GOVERNOR.

Reduced Price List, Nov. 1, 1879.

EXTRA FOR



| Size of Governor | Black. | Finished. | Ball and Lever. | Speeder. | Automatic Safety Check. | Stop Valve. |
|------------------|---------|-----------|-----------------|----------|-------------------------|-------------|
| 3/4 in. | \$16.00 | \$18.00 | \$1.00 | \$2.25 | \$5.00 | \$4.00 |
| 1 in. | 18.00 | 20.00 | 2.00 | 2.35 | 5.00 | 5.00 |
| 1 1/4 in. | 20.00 | 22.00 | 2.25 | 2.50 | 6.00 | 6.00 |
| 1 1/2 in. | 23.00 | 25.00 | 2.50 | 2.75 | 8.00 | 7.50 |
| 2 in. | 27.00 | 31.00 | 2.75 | 2.75 | 9.00 | 9.00 |
| 2 1/2 in. | 30.00 | 41.00 | 3.50 | 3.50 | 10.00 | 12.00 |
| 3 in. | 32.00 | 45.00 | 4.25 | 4.25 | 11.00 | 17.00 |
| 3 1/2 in. | 34.00 | 48.00 | 4.50 | 4.50 | 12.50 | 21.00 |
| 4 in. | 36.00 | 52.00 | 5.00 | 5.00 | 14.50 | 25.00 |
| 4 1/2 in. | 38.00 | 56.00 | 5.50 | 5.50 | 16.00 | 31.00 |
| 5 in. | 40.00 | 60.00 | 6.00 | 6.00 | 17.50 | 37.00 |
| 5 1/2 in. | 42.00 | 64.00 | 7.00 | 7.50 | 19.00 | 50.00 |
| 6 in. | 44.00 | 68.00 | 8.00 | 8.50 | 22.00 | 60.00 |
| 7 in. | 48.00 | 76.00 | 9.00 | 10.00 | 25.00 | 75.00 |

TO ALL WHO USE STEAM POWER.—We will put our Governor on any engine and warrant it to prove superior to all others, and to do all we claim for it. If, after a fair trial, it does not, we will take it off at our own expense. No charge for boxing. Manufactured by

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1-4, and 1 inch by 1-8, as rapidly as

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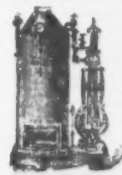
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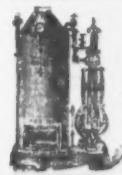
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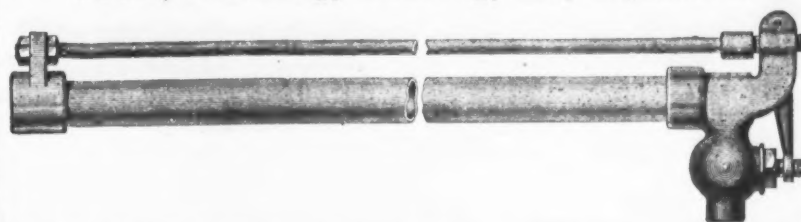
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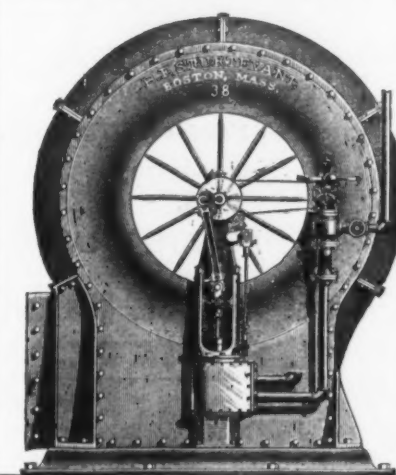
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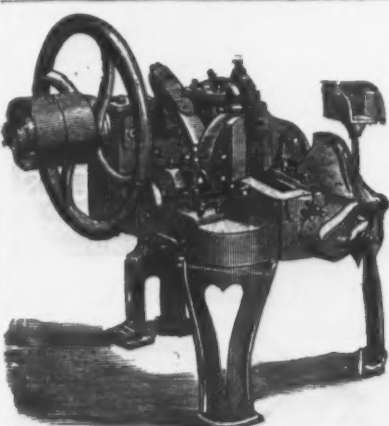
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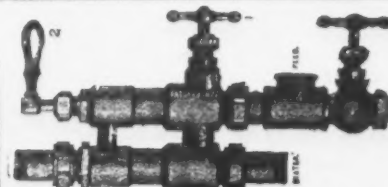
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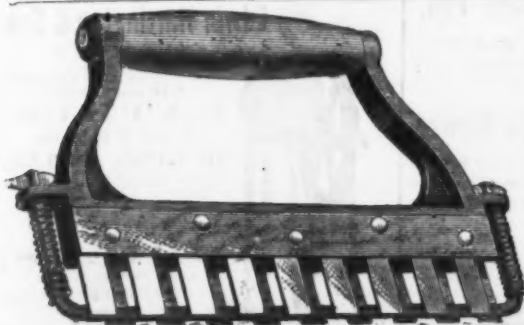
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strike as with a chopping knife,
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or more directions. Turn the steak
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Other Metals Always Bright,
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ON A NEW PRINCIPLE.They give, by actual test, 50 per cent. more power at closing point
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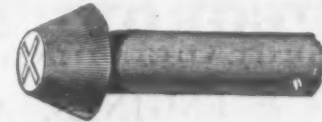
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